Arthur Sinclair, F.L.S.

The TROPICAL AGRICULTURIST

MONTHLY.

Vol. XIX. COLOMBO, MAY 1st, 1900. No. 11.

"PIONEERS OF THE PLANTING ENTERPRISE IN CEYLON."

(Third Series.)

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PLANTER AND VISITING AGENT IN CEYLON.

[THE STORY OF HIS LIFE AND TIMES AS TOLD BY HIMSELF.]

IN a snug, little farm-house at King Édward, Aberdeenshire, I was born one dreigh day in December, 1832. My earliest recollection is a ploughing match, or "love darg," by the neighbours on the occasion of my father retiring to Turriff, an adjacent township :

"A wee bit placie nestlin' doon
Wi' burns and hills and wide aroon ;
It's hardly what you'd ca' a toon,
Oor native Turra.

But little placie tho' it be,
It's dear to many mair than me,
And prood are we to say that we
Were born and bred near Turra."

SCHOOLS.

Here I was sent to school at the age of five. Albeit letters were not of the first importance at Mrs. Cruickshank's establishment, knitting was her forte, and she insisted upon all her pupils of both sexes being proficient in this art, a technical education which has not as yet proved eminently useful to me, but who knows? The day may come, as it did to Robt. Knox, to whom the knitting and hawking of caps led to the opportunity of his escaping from Ceylon.

I graduated in my seventh year and entered the Parish-school, then ably conducted by the Rev. John Clark; and here I soon took a fairly good position. At the end of my third year I got to the front, or "McCulloch class" next to the village lad of pairts—'gas Johnie' who by the way still survives as the Rev. Dr. Duncan, the esteemed minister o' Trinity Congregational Church, Aberdeen. In my tenth year my school education virtually ended, untoward circumstances followed, which henceforth deprived me of the dominie's aid, my father removing again to a bleak country district, where the school and schoolmaster belonged to a type so poor and primitive as to be quite a revelation to the village-bred boy who found nothing in common with the "heather peepers of Blacklaw." Two things went very much against my grain, the one was the carrying of a peat daily to school, and the other was the committing to memory of that profound document said to have been compiled "for those of weaker capacity," though to this day, I am bound to confess it is beyond mine. My parents were descended from an old Jacobite stock, at this time still rather at a discount, and although they would have offered no objections to my learning the Shorter Catechism, they would not enforce it. So left to the freedom of my own will, I decided to have none of it. In Turriff school I had been

allowed to repeat the Church of England Catechism with a few other "whistle kirk" bairns; but this enlightened dominie was horrified at the bare suggestion, and taking me aside, lectured me on the iniquity of belonging to such a sect, and said no creed containing such words as "Holy Catholic Church" should ever be repeated in his school! I ought to mention that this was in 1843, when there was a great upheaval amongst the Presbyterians, and any one whose "effectual calling" was not in the orthodox form, was looked upon with grave suspicion.

And here I may say ended my schooling and began my education such as it was and is. Scotland had doubtless a very admirable system of education and theology, and it was perhaps more my misfortune than my fault that I did not profit by it.

READING INDISCRIMINATELY.

Thrown upon my own resources, I read indiscriminately every book in my father's house, at least such as seemed to me at all interesting or intelligible. Blair's Sermons and Boston's "Fourfold State" hardly came within that category; but I found a perfect treasure in the gentle and scholarly James Hervey, whose "Reflections on a Flower Garden" I read and re-read with intense delight; planted a little flower-garden for myself, and on summer eves sat therein poring over my Hervey. Never had the tranquil and talented Rector of Weston-Favel a more devout disciple. Never had I seen a book better fitted

"To form the taste and raise the nobler part,
"To mend the morals, and to warm the heart."

There was no mere affectation in my love for this author; for on my first visit to Aberdeen the only "fairin" I purchased for myself, was six more volmes of Hervey, containing his delightful *Theron and Aspasia* and his defence thereof against the objections of John Wesley. Looking back from to day, it seems strange pabulum for a boy of 13; but it was the first book to really influence me, and so deeply interested was I in my treasure, that as I walked home from Aberdeen I could not help sitting down occasionally by the wayside to dip into it. The classical footnotes, however, sadly puzzled me, and awakened in me an ambition to dip into, Latin, which I did with more diligence than success; for my knowledge of Latin—never studied methodically,—amounted to little more than a string of roots, tenses and long words which, however, proved of use in after years. With French I was more successful, reading and writing the language with tolerable ease, though never able to speak it very fluently or intelligibly. The same may be said of my English; probably one of the many drawbacks of so-called self-education. I also tackled Trigonometry and Land Measuring with very fair success.

A GRAND DISCOVERY.

About this time I made a grand discovery. Speaking to a young ploughman, he remarked: "I say, min, I could gie ye a richt book for naething if you'd tak oot the lave o't." He had begun taking it out in parts, but found the bookman's calls came at inopportune times, when he felt more in need of tobacco than literature. I closed with this offer, and the boy boasted how cleverly he had sold me, and freed himself of the tax of 1*s.* per month. The book turned out to be Oliver Goldsmith's works, a perfect treasure and godsend to me; not so much for the matter as the manner in which it was said. I at once became charmed with a style of English I had never before seen or heard, and soon I became so thoroughly saturated with it, that to this day I can scarcely scribble a line without first thinking "how would Goldie have said it." No other writer—with the exception, perhaps, of Thomas de Quincey,—ever fascinated me so much. Both may have been eccentric, but certainly gifted and inspired to a marvellous degree. The beauty of the prose-poems and neatness of the humour was such as I had never before met with, while the descriptive notes of the latter, such as the scene of Catalina's travels, is—as I discovered in after life—drawn with wonderful fidelity.

BOTANICAL STUDIES.

Goldsmith was followed by "Rhind's Vegetable Kingdom," then looked upon as a sort of companion to "Animated Nature," and this book fixed my fate. Though not written like a "fairy tale," the Vegetable Kingdom was presented in a sufficiently attractive form to make plants, both wild and cultivated, from henceforth my chief hobby. The speedwell's peeping eye shed a new light from the hedgerow, the buttercups by the burnie brink became something more than buttercups to me, while exotics in the garden and window, even the familiar lupins, calceolarias and fuchsias had a life-history which it was a delight to trace, and I dreamed even then of visiting them someday in their own native habitat.

Rhind in due course was followed by Humboldt, whose "Geography of Plants" greatly interested me, and whose footprints on the slopes of the Andes I then dreamt of perhaps coming across. Meanwhile, though looked upon as rather an erratic and somewhat "dowie lad," I was not lazy; indeed, my little garden was already looked upon as an oasis in a wilderness of moorland farms, and a neigbouring farmer seeing my industry, gave me off a corner of a field measuring perhaps quarter of an acre,

which I tackled with as much diligence as any Chinaman, getting up by 4 a.m. and working till late at night.

"BOTRYTIS INFESTANS" OR POTATO BLIGHT.

The year was 1846, the summer one of the loveliest of the century. A little burn rippled past the ground in which by way of relaxation I bathed, caught trout and culled the *Nymphæa* from its margin; but my special pride was a plot of potatoes: the grand old blue kidney, nowhere now to be seen. No coffee planter ever saw with greater interest his first 100-acre clearing burst into blossom. Early one July morning I got up to watch the flowers expanding, when I observed what seemed drops of soot upon the tender green leaves. It looked like the work of some malicious miscreant, but no footprints were there, and I felt fairly puzzled. Next morning there were still more "soot drops," and every day during the week added to the mystery, till at length the haulins began to blacken, and a sickening smell greeted me as I approached my precious plot. I was only 14 years of age, but I shall never forget my first great discouragement as a planter; and when a quarter of a century afterwards I saw coffee attacked with a similar blight, I could not help remembering my early sorrow and fearing how little science could do for us.

Like the Ceylon planter of the "seventies," however, my horizon gradually expanded to other plants and products. I now sought and found congenial employment in a Nursery-garden to see how the various plants were propagated and learn the mysteries of grafting, budding and hybridising. He was a rough, unkindly fellow, the foreman, but a perfect workman; and I have seen few gardeners who could handle the knife, the rake or spade like old T——, but he had no taste or respect for science.

"See that you take that horse gowan out by the root," he said toa fellow-creeper who hadn just come from a bota nical class. "You mea, the *Leontedon taraxacum*, sir"? said the youth wishing perhaps to air his learuing. "Ah! I see," said the foreman sarcastically, "you're a bit of botanist." "Ay!" was the reply, "and I can *draw* a little too." "D——n you, *draw* that barrow out of my way?" was the rough rejoinder.

TRAINING FOR TROPICAL AGRICULTURE.

For eighteen months I laboured here; the work was hard but interesting enough. Yet, the plants were only native trees or hardy flowers from temperate latitudes, and I, longing to make the acquaintance of exotics from warmer regions, now apprenticed myself to a garden where there were good hot-houses, preparing, like many a better man, for what was to follow. I well remember my first little tropical acquaintance, viz., the *sensitive plant*. How I marvelled at the curiosity and never rested till I knew of its native home, and had read everything that was known about it, little thinking that in after years, it, as a troublesome weed, would cost me thousands of rupees to keep it down. Through the *Balsam* (*Impatiens*), *Nepenthes plumeria* and the *Gloriosa superba*, I was first introduced to Ceylon. I was in my element, and my special hobby and delight was in tracing every exotic I came across, to its original home, a labour which gave me much pleasurable reading.

FIRST EFFORTS AT WRITING.

In four years I had reached the top of my ambition as a gardener, and with the wide world before me began to look towards the Tropics for a more congenial field. I had already begun writing for the local press. My first accepted article being on "Evergreens," a contribution which led to the life-long friendship of Mr. Wm. Alexander, Editor of the Aberdeen *Free Press*, and one of the kindliest, purest-souled men I ever intimately knew.

About this time I was introduced by Mr. Geo. Dalrymple to Sir John Cheape, who, during a visit to Lady Elphinstone, came to consult me with reference to sending out certain varieties of Rhododendrons to Ceylon. "Will they grow in Ceylon"? enquired Sir John. "Unquestionably," was the reply. "How do I know"? "Well, I have just been reading Dr. Hoffmeister's delightful book in which he says that Rhododendrons not only grow wild at Nuwara Eliya and other upland districts, but on the very top of Adam's Peak he found a gorgeous display of blooms." Sir John was good enough to seem interested in me, and told me all about his estates near Kandy, managed by Mr. Mortimer, "a most capable man," he said, "though he had not the educational advantages you seem to have had" (save the mark!)

FIRST THOUGHTS OF CEYLON.

The excellent work by Dr. Hoffmeister was one of the first and certainly one of the *best* books on Ceylon I ever read.

A splendid young fellow was Dr. Hoffmeister, travelling Physician to H.R.H. Prince Waldemar of Prussia, the first German Prince to visit Ceylon. No keener, more observant botanist ever landed at Galle, and the fidelity of his description of the vegetation and natives, seen *en route* for Colombo, has rarely been excelled. The reception by Sir Colin Campbell, the journey to Kandy, thence *via* Pusellawa, where the brothers Worms were found planting their first clearings, and onwards to Nuwara Eliya and Badulla, where they were royally entertained by Major Rogers, is all graphically described. Dr. Hoffmeister was no sportsman, but while the Prince accompanied the Major on sundry shooting excursions, he contrived to extract great delight from his botanical rambles. The poor young physician and scientist (he was only 25) accompanied the Prince to India, where he collected much interesting and valuable information. Unfortunately, Britain was at the time embroiled in one of her inglorious border wars, and the Prince wishing to see fighting, went to the front, his faithful physician by his side. The latter was killed on the spot, and the sorrowing

relatives had only the melancholy satisfaction of publishing the admirable letters which, with the appendices addres ed to Baron Von Humboldt, form this most interesting volume.

GEO. E. DALRYMPLE.

The George Dalrymple mentioned above was uncle to "our Logie;" he also had been in Ceylon for seven years, during which time he had worked himself up into a leading position in a Kandy Firm. A tall and very handsome, beardless youth, he was popular with all classes and an especial favourite with the young military officers stationed at the Central Capital. One afternoon a bit of a lark was proposed, and no sooner said than done. Young Dalrymple was dressed as a lady, as near as possible *a la mode*, the next step was on to a high dog-cart, and one of the officers to drive "her" round the Lake; the chief object being to attract the attention of and arouse the jealousy of a certain Mrs. S———, who had recently begun to trot out two daughters.

Few in the present day of globe-trotters can imagine the consternation such a simple event caused in the early "fifties."

Round and round rode the handsome pair, and none was more critically interested in the new arrival than Mrs. S———. Most unfortunately, in turning a corner for the third time, right opposite her bungalow, the horse shied. Up went a wheel on the parapet and over went the occupants! With a shriek ran Mrs. S——— to the help of 'the lady," the screeching daughters behind her, but were shocked and thunderstruck to get hold of a top boot!

The next upshot was that Master George got a badly broken thigh which rendered him a cripple for life, and as such was ordered home. We all thought he had been injured while out hunting elephant; but Dr. Charsley, who attended him, gave me the true version of George's mishap. On returning home he started a Flax Works, but falling into the hands of Aberdeen Jews the project failed, and he went out to Australia where he did some good exploring work. I had thought of accompanying him, but at the last moment he said "*No*, you would be throwing yourself away, Ceylon is the place for you," and he offered to recommend me to his friend Simon Keir. Meanwhile, the following advertisement appeared in the *Aberdeen Journal*:—"Wanted for Ceylon, a young man of liberal education, with a knowledge of Agriculture. Applicants in own handwriting must state age, where educated, and how employed hitherto, good references required." I answered this and was the successful applicant.

START FOR CEYLON.

So, early in February, 1858, I sailed in the good mahogany ship "Albemarle," 400 tons burthen, my fellow-passengers being Ellis, Tindall, Wernham, Bruce, Hay, and the brothers Rossiter:—all gone now excepting one of the last-mentioned and myself.

The events of the four and half months, such as they were, were they not too fully chronicled in the *Aberdeen Free Press.*

We reached Colombo on the 10th June, a memorable day, of which Padre Ellis, as long as he lived, kept up the anniversary, by writing to me, often in pawky verse, of which the following is a sample:—

"Here's health, milk and meal
To an honest hearty chiel,
Deil cadge them in a creel
Wha doesna wish us baith weel."

ARRIVAL AND PECULIAR RECEPTION AT "OBSERVER" OFFICE.

Our reception in Baillie Street was peculiar. I had been asked by my fellow-passengers to write and publish a letter of thanks to Captain Collett for his considerate and unremitting kindness to us during the long voyage. Consequently, our first call in Colombo was at the *Observer* Office. Dr. Elliott sat in the Editorial chair, and after glancing over the MSS, said in his loud cheery voice, "We shall be *deloighted* to insert this;" but, and again he looked at us up and down, with a twinkle in his eye; then leaning back in his chair simply *roared*:—"Come here, Ferguson, and look at this," and the handsome head of a man in middle-life looked over the screen. "*Sample of passengers per Albemarle*," he said pointing to us, and they both laughed in ready chorus; while we, reddening with chagrin and surprise, drew back at the strange and unexpected reception. An explanation soon followed. Our names had been sent in by the Wharf clerk with the prefix "*Misses*," instead of "*Messrs.*" and all Colombo was on the *qui vive* to see the batch of young ladies, newly arrived!

Fred. Wernham and I were hospitably received by good genial Sylvester Richmond, whose hearty laugh was a grand entertainment in itself. Next evening found us in Kandy introduced to those keen coffee dealers, Sandy Brown and old Gerrard, the latter by this time in shady circumstances, but full of anecdote; the point or moral of his reminiscences, however, was not very edifying or encouraging to newcomers. Poor old rake! he evidently imagined he was having a ruse out of the raw arrivals, little thinking how minutely they weighed and appraised him.

ON THE HILLS.

My destination was Rangalla, a district that stood A1 in coffee planters' estimation, and Battegalla, which was acknowledged at that time to be the finest hill estate in the island. Mr. Duckworth, the fortunate proprietor, resided there and received me with great kindness. His father—one of the merchant princes of Liverpool—I had visited before leaving England, meeting the young student brother, now Canon Duckworth. Battegalla was indeed an ideal estate, combining good soil and shelter with a glorious view of the rich lowcountry beyond, 350 acres bearing at the rate of fully 15 cwt. per acre, an ample labour supply, rising prices, and altogether the prospects were as bright as ever they were before or since in Ceylon. Sir Henry Ward had just been up dining and complimenting the "spirited gentlemen of the district" for having made "a beautiful bandy-road of 9 miles from Teldeniya to their splendid estates."

The second day's tappal brought me a kindly letter from A. M. F. telling me he had just seen Capt. Collett with an armful of papers from Aberdeen containing my contributions on the voyage, and concluded by hoping I wouldn't send all the fruits of my pen to Aberdeen-awa, and here began another long-cherished friendship. Few outdoor occupations could be more attractive than Coffee planting in the "fifties." Coolies were more docile than they now are, the surrounding Sinhalese less corrupted and more respectful. The busy crop season was soon over and then came ample leisure, the interesting process of pruning, the beautiful blossoming time when bumper crops were estimated, after which those so minded could readily be spared for a sporting trip to Bintenne. Monotonous as the work seemed to many, to me it was a daily delight, albeit the climate had its drawbacks.

DYSENTERY.

We had just entered upon a wet cycle, and the surroundings during the S.-W. monsoon were decidedly damp. There were no bungalow fireplaces in those early days, no flannel shirts, the rains blew through the weather-boarding, and the bed-sheets had frequently to be wrung out before retiring. As a believer in hydropathy, I did not dream of the danger of this; but the result was, in the words of Dr. Charsley, "a rattling case of dysentery." Few Europeans escaped in those days: my colleague Mr. Greig had to seek a drier climate, while I was carried into Kandy—30 miles—by coolies, and was for some time despaired of. The kindness and skill of Dr. Charsley* and attentions of Dr. Symons and Mr. Sprott can never be forgotten, particularly during convalesence, when they took me for drives to Peradeniya Gardens, where Dr. Thwaites did so much to encourage and gratify my taste for plants. It was during one of those visits that I saw the first cuttings of cinchona ever introduced into Ceylon being planted in a propagating frame. Meanwhile, poor Mr. Duckworth had been left alone in the midst of crop, attempting work for which he was thoroughly unfitted: the wet coffee lay 5 feet deep on the barbecue, the smoke from which could be seen for miles around.

The weather, however, hardened up by the end of December, and with the aid of a clever adaptation of Clerihew—erected by our friend A. Greig—we struggled through the wet coffee, and by 1st March had the satisfaction of seeing Miner Cader cart away the last load to Colombo, over 20,000 bushels from about 300 acres in full bearing.

W. N. D.

Mr. Duckworth, though not a planter, was a gentleman of refined tastes, and managed to employ his time in a very interesting, if not very profitable, manner: a musican of no mean order, he could paint passably and even dabbled in verse, would often send a messenger to call me from a distant corner of the estate to hear or see his latest effort, and if I could but suggest a word or a half note by which a line would go more smoothly, he was more pleased than if I had added another cwt. per acre to the crop. "Don't go away," he would say, "tiffin is coming, and what do we pay kanganis for but to look after coolies," as if he had yet to learn, that kanganis were merely stuck on stones to warn the coolies of durai's approach.

PLANTING AND PLANTERS 40 YEARS AGO.

Forty years ago the planters were a comparatively small body, about 400 all told. The S.D. was treated with more consideration than he probably is now; relations with the Proprietor were most cordial, and seldom indeed did the S.D.† abuse the confidence or dishonour the position he was encouraged to occupy. In after years, I occasionally did come across something different. Once when making enquiries regarding the capabilities of an applicant for a situation, his employer wrote:—"My only reason for parting with him is that he is apt to get too d—d familiar; the sort of fellow who slaps you on the back when you go to visit him." This man did not get the appointment.

Then there was "R.B.T." 's man to whom he gave a certificate merely stating: "I hereby certify that the bearer requires to be taken down a considerable peg." And there is the other side, when the too exacting P.D. ordered his Superintendent to remove at once to the lowcountry and open some lands he had recently bought, to which the planter demurred as the place was known to be *hot and sickly*. "Hot," said the irate proprietor, "Superintendents ought to be ready to plant coffee in h——l if we so desire them". "*May be*," retorted the cautious Scot, "but I'm thinking it won't be necessary." "*Why?*" "Because you will doubtless all be resident proprietors there."

At the time I speak of, Mr. Duckworth had a visit from the redoubtable Andrew Nicol. "A.N." and "W.N.D." were old friends or rather the descendants of old friends, for individually, truth to tell, there was little love lost between them. "A.N." though in some respects less accomplished, had much more energy than the somewhat phlegmatic "W. N.D." over whom, moreover, he possessed a considerable influence, and at this time managed to arrange for the transfer of my services to his own employ, with a view, it was thought, of my succeeding Jas. S. Martin who was looking forward to a trip home.

MY FIRST MOVE.

Meanwhile, I was sent to reclaim a half-abandoned estate in Matale East, the wholly abandoned Superintendent of which had been carried into Kandy suffering sadly from "D.T."

Kabroosa had a history, dating from the famous rebellion of 1848, when every bungalow in the district was sacked with the solitary exception of this one. The Matale Volunteer Corps had not yet been formed, and the "doraimar" of the day finding it necessary to be in Kandy on urgent business, the estate buildings were the more easily looted. The conductor on Kabroosa, however, was a bit of a strategist: he mustered a score of stalwart coolies, took them to the bungalow, dressed them in dorai's clothes as far as they went, and seating them on chairs in the front verandah, armed each with an open *Observer*, and fearlessly awaited the approach of the enemy. By and by Appuhamy keeked out from the jungle on the opposite side of the stream, but seeing such an array of Mahatmayas beat a hasty retreat to Warriapola where the decisive battle was fought, resulting, sad to say, in one English Sergeant being wounded. The Government of Ceylon very properly pensioned this conductor.

MY NEIGHBOURS.

My near neighbours here were Wingate, a genial gentlemanly man, as were also the brothers Hope, always happy except when visiting the wind-blown wattie over the hill, where even the grindstone had to be staked and tethered to the ground!

Robt. Mitchell, on the adjoining estate, was a rather unpolished piece of granite, but the soul of hospitality, whose Sinhalese employer on his periodic visits invariably got drunk on champagne. "You must find those visits rather costly," I ventured to remark one day. "Oh! no," said Bob, "I just charge it to manuring."

Poor Paul Macrac, on the opposite side of the stream, was then a fine active specimen of a hielan'-man, more at home in Gaelic than in English—a

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* Our friend has forgotten to mention, how the first evening Dr. Charsley saw him in Kandy, he thought so seriously of his case that he said:—"If you have any little matters to put right, any important letters to write, I would advise you to see to them now.—ED. *T.A.*

† Sinna Durai—*anglice* "little master" or Assistant. —ED. *T.A.*

good planter, but his great delight was to dine the district, and his one after-dinner song, "*Robie Tamson's Smiddy*" was always ready and well-rendered. Poor Paul and Poor Bob! both came rather to grief in the end; good useful men, but had not the moral stamina to stand an attack of *Hemileia*.

Over the ridge on Daugkande swaggered, though more economically, our friend Christie, while John Gray on Cattaratenne remained a Buchan loon, pure and simple to the end of his days.

Kabroosa had just given its record crop, and its condition, in the words of Billy Rudd, was one of "*Veeds, Vips and Valking Sticks.*" I did my best to renovate the totum. True, I let light into the matted bushes, and when expostulated with, remarked with a certain air of native conceit, that I did not to go to Matale or even come to Ceylon to learn pruning.

"Never cut a primary," said the orthodox coffee planter. "Till it requires it," I added. Nevertheless, though dead branches no longer bear, they do give a certain amount of shelter to young shoots, and had I known the full force of the monsoon on these hills, I might have used the knife more sparingly.

Here I remained about 18 months, meanwhile opening and planting *Owelle*, one of the first of the Lower Matale estates and still flourishing in the list of that most prosperous of Companies, The Ceylon Land and Produce, Limited.

It was while planting here, that drowned out of my talipot hut, I rode for shelter to *Suduganga*, and thereby first made the acquaintance of Hugh Blacklaw, which led to a friendship of now 40 years, which stood the test too of seven years of official visiting! When Mr. Martin went home, I returned to Rangalla to manage Galleboda and Lovegrove estates; and it was while here I awoke one morning to find myself famous, or infamous, as the suspected writer of the notorious "*Young Scotsman letters:*" otherwise this period passed away without any striking incident.

WM. FERGUSON, F.L.S.

By the time Mr. Martin was ready to return, I had accepted a situation in Sabaragamuwa. In passing through Colombo I first met that genial soul, *Wm. Ferguson.* Who in the "fifties," "sixties," or "seventies," could visit Colombo without meeting and making the acquaintance of "W.F.?" And who that once enjoyed with him a ride round the gravets in his well-known and well-worn trap, could ever forget it? Kept more for use than ornament, his equipage was ever at the service of visitors, and to hear him talk of the trees and flowers by the wayside was a lesson in botany, while few professors could impart information with such success or delight to his listeners. Less of a litterateur than his gifted brother, he was in his own department unique in Ceylon. Let one but ask the name of the meanest little creeper in the hedgerow, and at once the trap was stopped, the horsekeeper sent for a handful, and "now let me tell you a story about this plant" he would begin; and for 10 minutes or more the story would flow in such idiomatic English with just a slight dash of highland accent. After such an object lesson, that IPOMEA would be for ever familiar to you. Or let any luckless native be found hacking a branch from a favourite tree and then listen to the castigation of the Vandal. "W. F." would not swear, he would not strike, but in fluency of cutting hard words, O'Connell would have been nowhere! The poor Yahoo trembling from top to toe would slink away. Meanwhile, we also would be moving on, and the intercepted story would begin again where it was left off. Altogether a more interesting and lovable man than Wm. Ferguson never lived in Ceylon. All who loved plants loved "W. F.," and the love of plants and flowers is the secret of success in Ceylon. "I never met but one man who hated flowers," said the late Editor of the *Spectator*, and this poor prejudiced creature was a Plymouth Brother, who believed that flowers were cursed with the ground, owing to the disobedience of Adam and Eve!

EN ROUTE FOR RAKWANA.

The journey through the ancient Province of Sabaragamuwa was not so easily accomplished forty years ago as it now is. No Rakwana Defiance with spanking horses went up and down the Madampe hill at eight miles an hour. Only the weary hired and unwilling hack, upon which it was a feat to ride in three days, over the 90 miles of rough roads, portions of which were frequently flooded; indeed Chas. Shand was reported to have said he "once walked 10 miles under water." The Resthouses were poor. Awissawella might be looked upon as the *ultima thule* of civilisation, and even it did not strike me as very cheerful, the first thing pointed out being a spot at the end of the verandah where lay the bones of a predecessor.

At Ratnapura I found old "T. P."* busy with a gang of jail-birds digging for cat's-eyes, without much apparent success, judging from his looks. The natural beauty of the Gem City greatly charmed me, though verily, beyond the planting of a few Crotons, Poinsettia, Hibiscus, Datura, and a couple of Nutmeg trees, man had done but little to beautify the scene with exotics.

At Pelmadulla the sorry screw and I arrived wet and weary enough. "Do you know anything about an estate called Everton"? I asked of the old appu who stood in the door of his inhospitable-looking shed. "No, sir, only that all gentlemen who go there get sick and die" was the grim reply, the fact being that my three immediate predecessors got ill, of whom two died on the way to Colombo. No doctor nearer than 90 miles, and yet the poor Durais died!

IMPRESSIONS, AND NEW FRIENDS.

Hoping for better things I hastened onward and upward, finding Everton—the "Kabragalla" of the Sinhalese—for a wonder, bathed in sunshine. Here I pitched my camp and remained for five years, enjoying the ample elbow-room. I visited within a few months every hill top in the district, and carefully taking my bearings, got to know the locality better than most natives.

Rakwana had long been somewhat stagnant; "the first planted coffee," as Sir Henry Ward said, "was thin and bare;" but there were sheltered pockets of good soil which, judiciously opened, paid the planter well. I selected about 1,000 acres, and opened three estates, all of which ultimately did well. It was a lonely scattered district. At that time we were only five Europeans all told, David Mitchell, Joe Bennison, M. Moss, Reid and myself.

David, the father of the district, was one of the gentlest of men, albeit clothed in a somewhat rough exterior, hospitable to a fault, scrupulously

* Tom Power, C.C.S.

honorable in all his dealings, and tender-hearted as the most motherly woman, never in a hurry and inclined to be somewhat prosy; yet, one rarely wearied in waiting for the completion of David's story. Joe, too, was as good a fellow as ever dropped an H or entertained a neighbour, and no better planter ever mustered coolies in Rakwana. M. Moss, though he kept his guns cleaner than his estate, was all round a gentleman and a sportsman to be depended upon in any emergency. Poor Reid was a waif frae Buchan, whose splendid penmanship was his only redeeming qualification. Such were the lords of a district 60 miles in circumference, sparsely inhabited and very partially cultivated. Yet in this "Wilderness of the Peak" I contrived to spend some of the pleasantest years of my planting life. Just as on boardship we get to know men more familiarly than it would be possible in a crowded city, I became intimately associated here with two men who had a considerable influence on my after-life—men whom I elsewhere might never have had the same chance of knowing.

W. HAY WODEHOUSE AND J. W. BIRCH.

The first and best was Mr. Haye Wodehouse (C.C.S.) whom I met at the Ratnapura resthouse on the way up, and was so struck with his courteous, kindly bearing to all around him, so different from the average John Bull who bullies appus and kicks kudirakarens that I reported him on my arrival at Rakwana as the most amiable man I had ever met.

"Ah!" said David with a kindly twinkle, "let us invite him up," which we did, and for two years I saw much of the Temple Lands Commissioner, who frequently stayed with me for a week, and whom I as frequently accompanied on many of his pilgrimages through village lands; in the intervals many scores of letters passing between us. Son of Canon Wodehouse, a family of stupendous pedigree, Wodehouse was a highly polished, scholarly aristocrat with all the advantages I had most lacked, yet he was pleased to discover many affinities in our reading tastes. We agreed to take out on joint account some of the best magazines of the day, and much of our correspondence related to the different writers and their styles. This of itself was an education for me which I greatly appreciated.

My other friend, J. W. Birch (C.C.S.) was in many respects the very antipodes of W. H. W.—Wodey always dignified and leisurely, whether dressed for dinner or enjoying his matutinal pipe, was ever the pink of propriety. B. was ready, rough and careless of his toggery, but an energetic, clever man of outstanding ability. W. inclined to be lazy, but always suave and kind to the meanest cooly! B. simply indefatigable, could work day and night and lick a dozen Sinhalese into shape before breakfast. "Does not know the word difficulty," said Sir H. Robinson,—W. scrupulous in statements and refined in his language; B. would swear till all was blue, and illustrate his after-dinner yarns with the most monstrous of Rougemont-like fables; and "if you don't believe me ask ——" he would say, —— being a relative and another well-known economist of truth. Both W. and B. were men whom it was interesting and profitable to know, far above the average in administrative ability, while as letter-writers the best I ever came across, never too busy to reply to a note, yet never like the fussy man asking to be excused while he did so.

Dear Wodey has slept soundly in Borella for the past 30 years; but the last visit I paid in Colombo two years ago was to his grave. "Poor Colonial Birch," as H. S. O. Russell was wont to call him, was assassinated in Perak.

Mr. Russell, by the way, who acted for sometime as Agent at Ratnapura, was altogether a different type from Birch! He ruled the district with a dignified hauteur—slow, sarcastic, but very choice in his language. In the most polite way he could make his belted peon tremble with fear, as he deliberately exclaimed when very angry, "You son of a —— misguided woman!" An admirable administrator, however, the district was never more conscientiously ruled than in his day: no shady gem-pit digging, no broken heads by H. S. O. R., and the day soon came when he was promoted to the Central Province.

CALLED TO THE C.P. AS V.A.

About the same time I also had "a call"—as the ministers say—and selecting Kandy as my centre, entered upon the busiest portion of my life; travelling as V.A. over the length and breadth of the island for the next ten years, almost continuously in the saddle. It may be thought that the wilds of Sabaragamuwa was not a very good training ground for an Estate Inspector in the C.P., but as a matter of fact, my planting experience was acquired in Aberdeenshire. What I had chiefly to learn in Ceylon was the nature of the different localities on an island where every few miles give a change of soil and climate. Coffee-planting in rugged but richly-cropping Rangala was quite a different matter from the culture of the same plant in the leafy dales of Dimbula; and estates in poor patchy Sabaragamwua required more careful treatment than those in the more happy-go-lucky Haputale. This experience I had now ample opportunity of acquiring. Beginning with a modest dozen estates, they gradually increased upon my hands, till at the end of my second year I had three times that number, and in a few years more the numbers rose to 100 or about one-twelfth of the island's extent of Coffee, and my duties were not merely to report on the condition of the estates, but to direct the cultivation and estimate the crops. Those were the days before *Hemileia vastatrtx.*

My remuneration was now over £2,000 stg. per annum, equal to that of the Lord Bishop!

RETIREMENT.

And yet I retired at the age of 40! Some remain the year too many; peradventure others retire prematurely; but who knows? There was much to induce me to stay; but the superior attractions of Aberdeenshire prevailed.

As showing the cordial relations between a V.A. and his Colombo Agents in the seventies, the following letter from a leading firm may suffice:—

"Colombo, 14th October, 1873.

"Dear Sir,

"In now relinquishing your valuable services, "we beg to reciprocate sincerely the good feelings "expressed in your letter, and to assure you that "the intercourse carried on between us, has "afforded us the utmost satisfaction in every way.

"The able and conscientious nature of your "Reports has been much appreciated by our Consti-"tuents both here and in England, and we feel satis-"fied that their several properties have benefitted "much by the good directions you have been able "to give to the Superintendents in charge.

"We remain, &c.,

"George Steuart & Co,"

James Sangster Martin, for whom I acted fourteen years before, now undertook a portion of the work I left. James was the elder brother of the equally well-known John, perhaps the more intellectual of the two; but both were first-rate planters, indeed none better ever came to Ceylon.

I had scarcely reached Aberdeen when I got a wire that J. S. M. had died of dysentery. It was in the end of May (1874), the trees were bursting into leaf. I had not seen a summer for sixteen years, and not feeling disposed to resume my duties at once, I gave up all idea of returning to my post!

Now for the next ten years I extracted as much enjoyment out of life as perhaps ever falls to the lot of ordinary unambitious mortals; but at the end of this time I fell amongst thieves, and as misfortunes rarely come single, the *Hemileia* must needs play havoc with securities in Ceylon at the same time, so that I began to look abroad again for investments and occupation, resulting in a trip to *Tasmania*, an adventure often talked of with friends now gone, R. B. T., J. S. M. and others.

PROSPECTING IN TASMANIA.

Of my experiences there have I not written fully to the *Observer* under the heading "In search of a Home." My prospecting during these three years cost me over £2,000, money not by any means wasted, as I gained in return a more thorough knowledge of this beautiful, if in many respects over-rated and sadly misguided island than many of the natives possess, and learned to appreciate better our own bountiful native land on which there is yet ample room.

Calling in passing and repassing upon my first love, Ceylon, I found her more interesting and beautiful than ever.

"HOW I FOUND MY WATTIE."

The old *Wattie* on which I lived and reared a family, though now uncultivated, was not abandoned, hundreds of tree and flowers—escapes from the Botanical Gardens—grew there where they never grew before; the fruit trees I planted thirty years ago, jak, mango, coconut and lime, now waxing old and bearing heavily. The sensitive plant, with its clover-like blossoms, covered the walk like a carpet, a walk made just eighty years ago to enable Lady Barnes to enjoy the view. The sweet little yellow *Thunbergia* peeped with its dark eye from amongst the weeds by the wayside, while its rich mauve-flowering relative, the noble *Laurafolia*, hung in festoons from the arms of the gaunt cotton tree. The flowers on the huge Sapu trees scent the air, while the indigenous Guava—from which the district derives its name—*Pera*(deniya)—was in many places an impenetrable thicket, Lantana only—once so luxuriant—now decaying, and being supplanted by a sunflower, also from S. America. The *Bougainvillea* with its rose-coloured bracts, hides the crumbling ruins of the godowns, while the *Inga Saman* trees which, on the recommendation of Dr. Thwaites in 1870, I transplanted from the garden now throw a grateful shade over the old bungalow, looking so inviting and with its sunny memories doubly interesting. The view from the verandah greener and richer than of yore; the old sugar estate—an abandoned common in the sixties—now a splendid sheet of luxuriant and valuable tea. Why should Primrose Hill not be again utilized? Why should the lost wattie not be regained? The desire was natural and in process of time was gratified. Yet one cannot live upon a wealth of wild flowers or on the distant view however lovely:—

"Such wealth is but a name
That leaves our useful products still the same."

The next step was to replant the totum, which I did very successfully; and while the tea, &c., was growing, I made sundry excursions into other parts of the world, the most notable being Peru* and Australia as elsewhere described; but my home in Ceylon—preserved as a winter resort—is still my favourite stand-by.

* See "In Tropical Lands: Recent Travels to the Sources of the Amazon, the West Indian Islands, and Ceylon"—by A. Sinclair, F.R.C.I., etc.—"Ceylon Observer" Book Store, Colombo.

View of Mahavillaganga from Primrose Hill Bungalow.

A SKETCH OF THE HISTORY OF INDIAN BOTANY.*

BY SIR GEORGE KING, K.C.I.E., LL.D., M.B., F.R.S.

(Continued from page 649.)

Somewhat similar to Griffith in temperament and versatility was the brilliant Victor Jacquemont, a French Botanist who, at the instance of the Paris Natural History Museum, travelled in India for three years from 1829 to 1832. During this period Jacqemont collected largely in the Gangetic plain. He then entered the North-West Himalaya at Mussourie, explored Gharwal and Sirmur, ascended the Sutlej to Kanawer and Piti (at that time unexplored), visited Cashmir, and returning to the plains, crossed Northern Rajputana to Malwa and the Deccan. He finally reached Bombay with the intention of returning to France. But at Bombay he succumbed to disease of the liver, brought on by hard work and exposure. His remains, after having lain in the cemetery there for fifty years, were, with that tender regard for the personality of her famous sons which France has always shown, exhumed in 1881, and conveyed in a France frigate to find a permanent resting-place in the place of Jacquemont's birth. Jacquemont's collections were transmitted to Paris, and his plants were described by Cambessedes and Decaisne, while his non-botanical colleotions were elaborated by workers in the branches of science to which they respectively appertained, the whole being published in four volumes quarto, at the expense of the French Government.

The roll of eminent Botanists who worked in India during the first half of the century closes with the name of Thomas Thomson, who collected plants extensively between 1842 and 1847 in Rohilkund and the Punjab, and again still more extensively during a Government mission to the North-West Himalaya and Tibet which was continued from 1847 to 1849. During this period Dr. Thomson explored Simla, Kanawar, Piti, Cashmir, Ladak, and part of the Karakoram. His collections, which were large and important, were transmitted to the Botanic Garden at Calcutta, and thence in part to Kew. They formed no insignificant part of the materials on which the 'Flora Indica' and 'Flora of British India' were founded. Dr. Thomson also published an account of his travels—an admirable book, though now jostled out of memory by the quantities of subsequently issued books of Himalayan travel and adventure.

About the year 1820 a second centre of Botanical enterprise was established at Seharunpore, in the North-West Provinces. A large old garden near that important town, which had been originally founded by some Mohammedan nobles of the Delhi Court, was taken over by the Honourable Company, and was gradually put upon a scientific basis by Dr. George Govan, who was appointed its first superintendent. Dr. Govan was in 1823 succeeded by Dr. J. Forbes Royle, and he in 1832 by Dr. Hugh Falconer. Dr. Royle made collections in the Jumno-Gangetic plain, in the Lower Gharwal Himalaya, and in Cashmir. He was distinguished in the field of Economic rather than in that of Systematic Botany, his chief contribution to the latter having been a folio volume entitled 'Illustrations of the Botany of the Himalaya Mountains.' His valuable labours as an Economic Botanist will be noticed later on. Hugh Falconer was an accomplished palæontologist who devoted but little of his splendid talents to Botany. His great contribution to palæontology, the value of which it is almost impossible to over-estimate, consisted of his exploration and classification of the tertiary fossils of the Sewalik range. Falconer was transferred to the Calcutta Garden in 1842. He was succeeded at Seharunpore by Dr. W. Jameson, who explored the Botany of Gharwal, Kamaon, and Cashmir, but who published nothing Botanical, his chief energies having been devoted to the useful work of introducing the cultivation of the China tea plant into British India, and this he did (as will afterwards be mentioned) with triumphant success.

During the first half of the century, a considerable amount of excellent Botanic work was done in Western India by Graham, Law, Nimmo, Gibson, Stocks, and Dalzell, the results of whose labours culminated in the preparation by Graham of a List of the Plants of Bombay, which was not, however, published until 1839 (after his death); in the publication by Stocks of various papers on the Botany of Scinde; and in the publication by Dalzell and Gibson in 1861 of his 'Flora of Bombay.' It is impossible in a brief review like the present to mention the names of all the workers who, in various parts of the gradually extending Indian Empire, added to our knowledge of its Botanical wealth. It must suffice to mention the names of a few of the chief, such as Hardwicke, Madden, Munro, Edgeworth, Lance, and Vicary, who collected and observed in Northern India, and who all, except the two last mentioned, also published Botanical papers and pamphlets of more or less importance; Jenkins, Masters, Mack, Simons, and Oldham, who all collected extensively in Assam; Hofmeister, who accompanied Prince Waldemar of Prussia, and whose collections form the basis of the fine work by Klotzsch and Garcke (*Reis. Pr. Wald.*); Norris, Prince, Lobb, and Cuming, whose labours were in Penang and Malacca; and last, but not least, Strachey and Winterbottom, whose large and valuable collections, amounting to about 2,000 species, were made during 1848 to 1850 in the higher ranges of the Kamaon and Gharwal Himalaya, and in the adjacent parts of Tibet. In referring to the latter classic Herbarium, Sir Joseph Hooker remarks that it is 'the most valuable for its size that has ever been distributed from India.' General Strachey is the only one who survives of the splendid band of collectors whom I have mentioned. I cannot conclude this brief account of the Botanical labours of tour first period without mentioning one more book, and that is the 'Hortus Calcuttensis' of Voigt. Under the form of a list, this excellent work, published in 1845, contains a great deal of information about the plants growing near Calcutta, either wild or in fields and gardens. It is strong in vernacular names and vegetable economics.

The second period of our history begins with the arrival in India in 1848 of Sir (then Dr.) Joseph Hooker. This distinguished Botanist came out in the suite of Lord Dalhousie, who had been appointed Governor-General of India. The province to the exploration of which Sir Joseph directed his chief attention was that of Sikkim in the Eastern Himalaya, the higher and inner ranges of which had never previously been visited by a Botanist, for Griffith's explorations had been confined to the lower and outer spurs. The results of Sir Joseph's labour in Sikkim were enormous. Towards the end of his exploration of Sikkim he was joined by Dr. Thomas Thomson, and the two friends subsequently explored the Khasia Hills (one of the richest collecting grounds in the world), and also to some extent the districts of Sylhet, Cachar, and Chittagong. Dr. Thomson subsequently amalgamated the collections made by himself in the Western Himalaya with those made in Sikkim by Sir Joseph individually, and by them both conjointly in Eastern India; and a distribution of the duplicates after the fashion of the Wallichian issue, and second only to it in importance, was subsequently made from Kew. The number of species thus issued amounted to from 6,000 to 7,000, and the individuals were much more numerous than those of the Wallichian collection. The immediate literary results of Sir Joseph Hooker's visit to Sikkim were, (1) his superbly illustrated monograph of the new and magnificent species of *Rhododendron* which he had discovered; (2) a similar splendid volume illustrated by plates founded on drawings of certain other prominent plants of the Eastern Himalaya which had been made

* From the Report of the Sixty-ninth Meeting of the British Association for the Advancement of Science held at Dover in September, 1899.

for Mr. Cathcart, a number of the Civil Service of India, and (3) his classio 'Himalayan Journals'—a bock which remains until this day the richest repertory of information concerning the botany, geography, and anthropology of the eastern Himalaya. A remoter result was the appearance in 1855 of the first volume of a 'Flora Indica,' projected by himself and his friend Dr. Thomson. The first half of this volnme is occupied by a masterly introductory essay on Indian Botany, of which it is hardly possible to overrate the importance. This remarkable essay contains by far the most important contribution to the Physico-Geographical Botany of India that has ever been made, and it abounds in sagacious observations on the limitation of species and on hybridisation, besides containing much information on the history of Indian Botanical collections and collectors. The taxonomic part of the book was cast in a large mould, and the descriptions were written in Latin. Unfortnnately the condition of Dr. Thomson's health and the pressure of Sir Joseph's official duties at Kew made it impossible that the book should be continued on the magnificent scale on which it had been conceived. After a period of about twelve years Sir Joeeph, however, returned to the task of preparing, with the aid of other Botanists, a Flora of the Indian Empire, conceived on a smaller scale and written in the English language. His proposals for this work were accepted and officially sanctioned by the Duke of Argyll while he was Secretary of State for India. The first part of this great work was published in 1872 and the last in 1897. In the execution of this great nndertaking Sir Joseph had the assistance of Mr. C. B. Clarke, who elaborated varions natnral orders; of Mr. J. G. Baker, who worked out *Leguminosæ* and *Scitamineæ*, and of Sir W. Thiselton Dyer, Messrs. A. W. Bennett, Anderson, Edgeworth. Hiern, Lawson, Maxwell Masters, Stapf, and Gamble, The greater proportion, however, of the book is Sir Joseph's own work, and noble monument it forms of his devotion and genins.

Since the date of Sir Joseph Hooker's visit to India, by far the most important Botanical work done in India has been that of Mr. C. B. Clarke. Rather than attempt to give any appreciation of my own of Mr. Clarke's labonrs (which would be more or less of an impertinence), I may be allowed to quote from the preface to the conclnding volnme of the 'Flora of British India,' Sir Joseph Hooker's estimate of them. Referring to all the collections received at Kew since the preparation of the 'Flora' was begun, Sir Joseph writes: 'The first in importance amongst them are Mr. C. B. Clarke's, whether for their extent, the knowledge and judgement with which the specimens were selected, ticketed, and preserved, and for the valuable observations which accompany them.' Mr. Clarke has published numerour papers on Indian Botanical subjects in the Jonrnals of the Linnæan and other societies. He has issued as independent books monographs of Indian *Compositeæ* and *Cyrtandraceæ*, the former in octavo, the latter in folio, and illustrated by many plates; and he is now engaged on his *opus maximum;* viz. a monography of the *Cyperaceæ*, not only of India, but of the whole world; and to the completion and publication of this every systematic Botanist is looking forward with eager anxiety.

During the second half of the century Dr. Thomas Anderson, who was for ten years superintendent of the Calcutta Garden, collected much; and he had just entered on what promised to be a brilliant career of Botanical authorship when his life was cnt short by disease of the liver, contracted during his labours to establish the cultivation in British India of the quinine-yielding species of cinchona. Dr. Anderson was also the earliest Conservator of Forests in Bengal. Sulpiz Kurz, for many years Curator of the Calcutta Herbarium, also collected largely in Burma, and besides many excellent papers which he contributed to the 'Jonrnal of the Asatic Society of Bengal,' he prepared for Government an excellent manual entitled 'The Forest Flora of Burma.' This was published in two volnmes in 1877. Other collectors in Burma were Colone Eyre (in Pegu), Mr. Bnrness (at Ava), and tbe Rev. Mr. Parish, to whom horticnlturists are indebted for the introduction to Europe of the beantiful orchids of this province. And in this connection must be mentioned Mr. E. H. Man, C.I.E., who, although not himself a Botanist, has given for many years past the greatest possible help in the Botanical exploration of the Andaman and Nicobar groups of islands, our first knowledge of which was, by the way, derived from the collections made by the naturalists of the Australian and Danish exploring expeditions. A large book on Bnrma, which contains a good deal of Botany, was published by an American missionary named Mason, who resided for the greater part of his working life in that country. General Sir Henry Collett, who commanded a brigade during the last Burmese war, also made most interesting collections in that country, the novelties of which were described by himself in oollaboration with Mr. W. Botting Hemsley, of the Kew Herbarium, in the Linnæan Society's, 'Jonrnal' some years ago. Sir Henry Collett also collected mnch in the Khasia and Naga hills, and in the portion of the North-Western Himalaya of which Simla is the capital, and on these latter collections, together with the materials in Kew Herbarium, Sir Henry is now elaborating a local Flora of Simla. The preparation of a local Flora for an Indian district is an entirely new departnre, and the publication of Sir Henry's book, which is to be well illnstrated, is looked forward to with much interest. At rather an earlier period, Dr. Aitchieson, C.I.E., was a diligent collector of the plants of the Pnnjab and of the North-Western Frontier. Some results of his work are to be found in his 'List of Punjab Plants,' which was published in 1867, and in various papers which he contributed (some of them in conjunction with Mr. Hemsley) to the Linnæan Society and to the Botanical Society of Edinburgh. In Dr. G. Henderson's book on Yarkand there are also descriptions of some plants of the extreme North-Western Himalaya and of Western Tibet. Mr. (now Sir George) Birdwood also made some contributions to the Botany of the Bombay Presidency.

Five officers of the Indian Forest Department, viz. Dr. Lindsay Stewart, Colonel Beddome, Sir D. Brandis, and Messrs. Talbot and Gamble, C.I.E., have within the past thirty years made important contributions to the systematic Botany of India. Dr. Stewart collected largely, and published in 1869 his 'Punjab Plants,' a book which gives a very imperfect impression of his acqnirements as a Botanist. Sir Dietrich Brandis issued in 1874 his admirably accnrate 'Forest Flora of the Noth-West Provinces of India,' illustrated by seventy excellent plates. Between the years 1869 and 1873, Colonel Beddome issued his 'Flora Sylvatica of the Madras Presidency,' illustrated by numerons plates. He also published, between 1869 and 1874, a volume of descriptions and figures of new Indian plants, under the title 'Icones Plantarum Indiæ Orientalis.' Colonel Beddome is the only Indian Botanist of note, except Griffith, Mr. C. B. Clarke, and Mr. C. W. Hope, who has written mnch on Indian Ferns. His two works, the 'Ferns of Sonthern India' and the 'Ferns of British India,' pnblished, the former in in 1863 and the latter between 1865 and 1870, practically give a systematio acconnt, together with excellent figures, of the whole Fern Flora of India. Of these excellent books a condensation in a popnlar and abridged form has also been issned. The fourth Forest officer who has published contributions to Systematic Botany is Mr. W. A. Talbot, whose 'List of the Trees, Shrubs, and Woody Climbers of the Bombay Presidency,' gives evidence of much careful research. And the fifth is Mr. J. S. Gamble, who besides amassing at his own expense probably the largest private collection of plants ever owned in India, has published a systematic account of the Indian *Bambuseæ*, a tribe of grasses which, from the

peculiarity of many of the species in the matter of flowering, had so long been the bane of the Indian agrostologist. Mr. Gamble, in his monograph, gives a description and a life-sized figure of every one of the Indian species. Of this monograph (which forms a volume of the 'Annals of the Botanic Garden, Calcutta') Sir Joseph Hooker writes (at p. 375, vol. vii. of his 'Flora of British India'): 'It is indispensable to the student of the tribe by reason of its descriptions and admirable plates and analyses.' Mr. Gamble has also published a Manual of Indian Timbers. A Forest officer who has ever ready to help in Botanical work, but who never himself published, was Mr. Gustav Mann, for many years Conservator of Forest in Assam, but now lost to India by his premature retirement. Other Forests officers, who have done, and are still doing, good botanical work in their various spheres, are Messrs. Lace, Heinig, Haines, McDonell, Ellis, Oliver, and Upendra Nath Kanjilal. Mr. Bourdillon, Conservator of Forests in the Travancore State, is also an enthusiastic Botanist and collector.

In the Madras Presidency Botanical work has been carried on during this second half of the century by Noton, Perrottet, Metz, Hohenacher, Schmidt (on the Nilgiris), Bidie, and Lawson. By the efforts of the latter two a second public Herbarium was established in Madras (the first having been broken up many years ago), and in this second Madras Herbarium are to be found many of the collections of Wight, besides those of the other Madras Botanists just named.

In the Bombay Presidency the only public Herbarium is at Poona. This is of recent origin, and owes its existence to the devotion of four men, viz. Dr. Theodore Cooke (late Principal of the College of Science at Poona), Mr. Marshall Woodrow (until recently Superintendent of the Garden at Guneshkind and Lecturer in Botany in the Poona College), the late Mr. Ranade (a native gentleman), and Dr. Lisboa (a medical practitioner in the Deccan)—all four enthusiastic Botanists. The amount of Government support given to ths Herbarium at Poona has hitherto been very inadeqnate. It is to be hoped that greater liberality may be extended to it now that a stranger to the Bombay Presidency has just been appointed to its chagge in the person of Mr. George Gammie, hitherto employed in the Cinchona Department of Bengal.

Reference has already been made to the Botanic Gardens at Seharunpore and Calcutta. But to complete this sketch, and especially in order to give a clear idea of the apparatus at prosent existing in India for carrying on the study and practice of Systemetic Botany, it is necessary again to refer to them. On the retirement of Dr. Jameson in 1872, Mr. J. F. Duthie was selected by the Secretary of State for India as Superintendent of the Seharunpore Garden. Mr. Duthie is still at Seharunpore. During his tenure of office he has added to the Herbarium previously existing there (which consisted chiefly of the collections of Royle, Falconer, and Jameson) a magnificent collection of his own. Mr. Duthie has published a valuable book on the 'Field and Garden Crops of the North-Western Provinces,' and another on the Grasses of the same area. He is now engaged on the preparation of local Floras of the North-Western Provinces and of the Punjab.

The Calcutta Garden at the Date of Sir J. D. Hooker's arrival in India in 1848 was under the temporary charge of Dr. McClelland, who soon made way for Dr. Falconer, who, in 1855, was succeeded by D. J. Thomson, and he in turn by Dr. T. Anderson in 1861. Mr. C. B. Clarke acted as Superintendent during the interregnum between Dr. Anderson's lamented death in 1870 and my own appointment in 1871. The Garden and Herbarium at Calcutta have been most liberally supported by the Government of Bengal. By funds thus supplied the Garden has been remodelled and improved; the Herbarium has been housed in an excellent fire-proof building (erected in 1883), and the collections of which it consists have been greatly increased. The chief items of these after acquistions have been the large contributions of Mr. C. B. Clarke; of Dr. D. Prain, for many years Curator of the Hebarium, and now Superintendent of the Garden and of the cinchona plantation and factory; of Mr. G. A. Gammie, formerly one of the staff of the cinchona plantation and now Lecturer on Botany in the College of Science at Poona; of Mr. R. Pantling, Deputy-Superintendent of the Cinchona plantation, who, in addition to dried specimens of the orchids of Sikkim, contributed nearly five hundred drawings, most of which have been lithographed as the illstrations to a book published in the 'Annals' of the Garden as the 'Orchid Flora of Sikkim;' of Mr. Kunsler, a collector in the Malay Peninsula; and last, but by no means least, of a trained band of aborigines of Sikkim named Lepchas who possesses keener powers of observation of natural objects, more patience, sweeter tempers, and, I am bound in fairness to add, dirtier clothes than any race I have ever met—black, yellow, or white! In addition to their liberal grants to the Garden and Herbarium, the Bengal Government, twelve years ago, sanctioned the publication, at their expense, as occasion might offer, of monographs of important families or genera of Indian plants. These monographs are printed in quarto, and they are, with one exception, profusely illustrated by plates drawn and lithographed by Bengali draughtsmen. The series is known as 'The Annuals of the Royal Botanic Garden Calcutta,' and it has now reached its eighth volume, the ninth being in active preparation. These 'Annals' have been contributed to by Dr. Prain (my successor at the Calcutta Garden) by Dr. D. Douglas Cunningham, Mr. J. S. Gamble, Mr. R. Pantling, and myself.

About ten years ago, it occured to the Supreme Government of India that it might be to the interest of Science if the four Botanical establishments at Calcutta, Seharunpore, Madras, and Poona were to be formed into a kind of hierarchy under the designation of the Botanical Survey of India, without removing either the officers of the four institutions to which they were attached from the financial or general control of the local administrations within which they are respectively situated, the Supreme Government making a small contribution of money for the purpose of exploring little-known districts and making itself responsible for the cost of a publication called 'The Records of the Botanical Survey.' The four institutions just mentioned continue, therefore, to be piad for and controlled by the Governments of Bengal, the North-Western Provinces, Mrdras, and Bombay, but their Superintendents are placed on the cadre of the Botanical Survey. The published Records of this Survey now extended to twelve numbers, each of which is devoted to an account of the Botany of some parts of the enormous and continually expanding are to be explored.

Such, then, is the machinery by which Systematic and Geographical, as distinguished from Economic and Physiological, Botany is carried on within the Indian Empire. But the work done in India itself by no means represents all that is being carried on in connection with the elucidation of the Flora of the Empire of India. On the contrary the bulk of the work of elaborating the meterials sent from India in the shape of dried specimens has always been, and must always be, done in a large Herbarium; and until lately no Herbarium in Asia has been sufficiently extensive. The last word on every difficult taxonomic question must still lie in Europe. A very large number of the Herbarium specimens collected in India have found their way to the various centres of Botanical activity in Europe, and have been described by Botanists of many nationalities. The lion's share of these specimens has naturally come to the two great national Herbaria in the British Museum and at Kew, but especially to the latter. It was in the Kew Herbarium that Sir Joseph Hooker and his collaborateurs prepared

the Flora of British India. And it is in the Kew Herbarium that are to be found the types of an overwhelming proportion of the new species described for the first time in that monumental work. The Kew Herbarium is therefore to the Indian Botanist the most important that exists. I must apologise for diverging for a moment to remind you what a type specimen is. It is the very one on which an author has founded any species to which he has given a name. And in order to determine absolutely what is the specific form to which the author meant his name to apply, it is often necessary to examine his type. The necessity increases in urgency with the extension of our knowledge of the Flora of the world.

(To be concluded.)

THE CAUSE OF DECAY IN PLANTS, AND THE REMEDY TO GIVE TO THEM NEW LIFE.

BY R. R. HARDING, CURATOR, BOTANIC GARDENS, TOOWOOMBA, QUEENSLAND.

The primary object of this paper is to direct attention to the results of unskilful planting of trees. I will endeavour to show that this is very expensive, and unsatisfactory in the end. When we consider that it takes only a little time longer to plant trees properly, the only exuse that can be given for not doing so is that the persons who plant trees or shrubs are afraid to separate the roots for fear of killing the plant. It would be, as a matter of fact much better to kill it then than to be disappointed in after years. Such cases are numerous in this town and I am often asked by residents here and by others in different parts of the colony, what is the reason for their trees looking so miserable?

Before I give a practical illustration of this, I will go back to the heading of this paper: "The Cause of Decay in Plants." Decay or disease is the antithesis of health, and, as the health of the plant means the correct performance of its functions, disease may be defined to be an incorrect performance of those functions. I believe that of all the various kinds and forms of disease to which plants are liable, none are so general or so fatal as those affecting the roots. In many, perhaps in most cases, it is extremely difficult to say precisely where disease orginates and how it is produced. It is only when we see it in some of its intense forms of developement that we are aware of its existence.

On the authority of the wisest of men there is nothing new under the sun, yet there are constantly presented to us things that appear, and are to us essentially new. Take the position of a tree. Its position may be said to be unchangeable; the soil, subsoils, atmosphere, and climate may be so far unvarying as to be also unchangeable. On the other hand, the roots of the tree are constantly year by year altering their position, traversing as it were the whole surrounding area in quest of food. Moisture also performs a very important part in the nourishment of the tree and all strata of soil penetrated by the roots are not equally full of moisture, so that when the roots pass through one stratum the tree is well nourished, and on passing through another it is less liberally supplied. Atmospheric influences also materially affect the tree, and as these vary so the growth varies. Insects, too, do occasional injury to trees by eating or poisoning their foliage, hence, as the foliage is good or healthy, or the reverse, so is the growth of the tree good or bad for that or for succeeding years. The mellow, withered, or fallen leaf in early or midsummer is not always a sure indication of a diseased tree, indeed it is always more satisfactory to find an evergreen tree of any kind shed its leaves freely on agitating the tree than that they should tenaciously hold by the tree after they have become withered. The decay or the dying of leaves in some instances, evidently depends on a want of vigour or on partial rot in the roots, but in a great majority of cases it is produced by injudicious planting and after cultivation. As an instance of this, I may state that last September I was requested to inspect the avenue of camphors growing in the Royal Agricultural Show Grounds. For the past two or three years they had looked very sick, each year getting worse, and they would eventually die if something extraordinary were not soon done to them. Various causes have been assigned for the appearance of these trees by those who have expressed their views upon the subject, but there was no difference of opinion as to their highly unsatisfactory state. Like most other places of similar extent in this part of the Downs, it is evident that the land in the area is not all alike in its suitability for the growth of trees; yet allowing for the difference, those conversant with tree culture will not have long to seek for the cause of this decay, which has been slowly but surely going on. The decline is not the result of old age, nor of the capabitity of the soil to grow and maintain the trees in a healthy condition, for a closer inspection of similar trees growing only a few yards away, confirmed my first opinion, which was that want of timely thinning and the want of nourishment at the roots, caused by bad planting, were at the bottom of it all. The questions put to me were—"Could anything be done to the trees to give them new life? Was it advisable to plant young trees between them, and when these had made a start to then take the sick ones out? The answer I gave was —"Leave them to me, with power to act, and they will be given new life." I remarked at the time these were planted that they would never make anything else but shrubs, and that only for a time. I examined the roots and foliage thoroughly, and found that three parts of the branches were dead or decaying and the foliage scant and yellow-tinted; but on examining the roots I saw at once the cause of all the evil. The trees in the first instance, had been planted too high; the roots when young had not been spread out; they were simply growing as if they remained in a pot, and those who know the size of these camphors will be surprised at my saying that the roots had not extended more than 6 feet from the stem of the tree, when they should have spread 12 feet at the least. The roots showed up out of the ground 2 feet from the trunk. They had embraced and interlocked each other and on account of the scant foliage, were exposed to the full rays of the sun, and the remark I made at the time of planting was now justified. My first work was to cut out the dead yellow branches, the centre of which was found to be decayed. Then all the inside branches were taken out, the surface of the soil under each tree was forked over very shallow, and outside the spread of the foliage a trench was dug all around the tree. Now this, of course, is the proper place to apply the nourishment, at the mouth of any tree, as here are situated the extremities of the roots, and as these feeding roots spread out beneath the soil pretty nearly to the same extent as the branches above ground, the tree should be fed at the distance of the extremity of the branches above ground from the stem. Here Nature teaches us a lesson: The head of the tree is in the form of a dome like an umbrella; all around the soil is exposed to the rain, and the water penetrates the earth just where the extremities of the roots are situated to receive it. In addition to this, the greater part of the rain which has washed and refreshed the leaves trickles down from the ends of the branches, and reaches the ground in the appropriate spot. In trenching around the trees immediately where the branches extended, the men were surprised to find no roots. This was nothing more than my practical experience expected, because, if there had been roots there would have been no necessity to do anything to the trees; but here was the mischief. The trees were then thoroughly mulched with half-rotten straw and manure, well covering up the large crinkled roots near the stem with a good coating of it. At the extremities, where the feeding roots should have been in the trench, the richest manure was

placed, but none was forked in. On the 17th March, the caretaker being present, we found that at the extremity of the trenching, and right up to within 3 feet of the stem, the young fibrous roots had formed a mat, and it was impossible to lift the mulching without damaging these roots. Now, what I wish to draw particular attention to is this: When the men started to fork over the surface they wanted to start near the stem. This I objected to at once, and made them keep their backs to it, showing them where the mistake is often made by digging underneath any tree or shrub. Each time you turn over the soil, so many rootlets suffer, because as you proceed you keep on doubling the roots over towards the stem, and this is carried on until the work is finished, when the soil is generally raked back again. Now this is against nature; it is similar to someone doubling your fingers back upon the wrist and leaving them there. The roots are left in that state until the next season, and then the same cruel operation is carried out again, until the roots are diseased by being constantly bruised and broken, when, of course, the tree suffers and begins to decay. The proper way to clean underneath a tree is to start just at the extremity of the branches, keeping your face to the opening until finished. You need not disturb the soil near the stem of a large tree, for do what you will there you cannot improve the growth of the tree; because all roots at that place cannot feed, being too large, but you can throw some of the soil from the first remove round the stem. If you want to prevent decay, feed them just as I have explained that is at the extremity of the feeding roots, and that is just where the rain trickles down from the leaves. A practical man can see immediately what is the matter with any tree that is sickly-looking; if the top of the tree is decaying, it is the fault of the tap-root entering the cold wet ground, and the remedy for this is to excavate and cut the tap-root clean off 1 say clean, for the least bruise will affect the tree's future growth. If the branches wither and the leaves fall off from the lower branches, it is because the surface roots have been disturbed and doubled back in the way I have already described. There may be some other cause, but that is the chief one. As all plants in this colony are surface rooted, it is advisable not to disturb them by that process. If the rootlets require separating the best way is to get a pointed pick and work from the stem by continuous drawing: this does no harm, and the few roots that are torn up are of advantage to the tree's growth; it separates the mats of roots and draws all towards the feeding point. There is no necessity to throw any soil back, get some mulching and cover all underneath the tree with a good coating. If you have any manure especially good, I have told you where to put it.

I know of one instance where the owner, wishing to prevent the roots of a camphor tree from coming into a bed made around the stem, placed bricks and sheet iron close round the bottom with the object of preventing its roots coming through; but very soon they got beyond this confinement; they turned upwards and now the 2 feet of soil is a mass of fibrous roots, and the tree has splendid foliage.

There is no pursuit wherein so much depends upon the right thing being done at the right time as in this; and in all other pursuits the man of close observation and systematic habits—who is not too proud to learn from any sources, however humble—is the one who will succeed, for there is no better guide than to seek the advice and experience of others and by following the advice tendered it will be the means of preventing decay, and will also give to the plants new life.—*Queensland Agric ultural Journal.*

HYBRIDISM IN CITRUS.—The seeds of Citrus often contain more than one embryo plant. Lately Mr. Webber has shown that in hybrid plants of Citrus only one of the embryos shows any trace of the pollen-parent, the true hybrid being derived from the egg-cell, and all the others by adventitious embryos produced from the nucellar tissue of the ovule. —*Gardeners' Chronicle.*

THE STRAITS: DEVELOPMENT OF THE FEDERATED MALAY STATES.

COFFEE, COCONUTS, AND RUBBER IN PERAK.

A representative of a Colombo Paper has had an interesting interview with a resident of the Federated Malay States, who is on a vist to Ceylon, showing the opening up of the country, the introduction of new products and the starting of new industries, all affording splendid opportunities for the investment of capital. The development of the country is gradually taking place, Europeans are settling down, and plantations of new products are being opened, while the mineral resources of the country is also attracting a share of attention. The climate is fine and agreeable, and there is plenty of rain, and the soil is described as very rich. Land can be secured on favourable terms from Government on a long lease at a nominal rent.

The Rev. W. E. Horley, of the Methodist Episcopal Church, an American institution, who afforded the representative the interview, has spent many years in the Malay Peninsula carrying on Mission work at Ipoh, in Perak, while he has also travelled all over the country.

COFFEE.

Regarding the introduction of coffee we were told that the soil is remarkably adapted for its cultivation, and during recent years large plantations were being opened up round about Ipoh by Chinese *towkyahs*, that is men who have made their fortunes in tin mining. At Taluk-anson, about forty miles from the coast up the Perak River, a fine, large plantation, about four to five years old, has been opened by a European Company, and this is now bearing heavily. An older plantation is Waterloo estate in Kinta district, which covers an extensive area, and was planted over ten years ago. With the exception of the first-named estate which is on low land, the others are all on the hills, about 100 miles from the coast. Most of them are now bearing, and the produce is transported by river and rail, being taken to Penang or Singopore by small steamers. The berries are fine and large, and there is no leaf disease, and the trees have a vigorous growth. The price of coffee, however, is at present very low, but notwithstanding this, the native growers keep up their plantations.

COCONUTS.

Cocount cultivation can be said to be quite a new introduction. Up till recently whatever nuts were required had to be imported from neighbouring countries, but now the first clearings are producing crops, while further extensions are in progress. A large clearing at the mouth of the Perak River which was laid down in nuts some four years ago is now in bearing which demonstrates the richness of the soil. The Straits Plantations Co., a European concern, is opening out several thousand acres; while they are also intending to erect oil mills on their premises. The natives are also going in largely for coconut cultivation, and on some of their patches there are trees already in bearing. Several new Companies are being formed for coconut cultivation on a large scale at the mouth of the Perak River; and the industry promises to be an important one in the near future. There are vast tracts of land suitable for coconuts, and only waiting to be opened.

PARA RUBBER

The cultivation of Para Rubber is just attracting some attention, and the product is being planted by both Europeans and natives in differnt localities. A wealthy Chinaman, with much enterprise, is going in for Rubber cultvation on a large scale at Kotabharu, in the Kinta Valley, which is about 30 miles from Taluk-anson. He is opening out about 5,000 acres, and has engaged a European Manager to supervise the work. Other plantations for this product are also being opened in the Kinta Valley; and large patches among the coffee, on the coffee estates, are to be seen planted with the new product. It is expected that satisfactory results will be obtained in Rubber cultivation.

SUGAR PLANTATIONS.

The sugar industry in the Malay States, like that of the adjacent countries, is an old one. The cane thrives, very well, and in the Malay Peninsula is principally grown in the Krin District, adjoining Lower Perak, on the coast most of the plantations being owned by European Companies, but the cane is now being introduced inland and a large tract of land is being opened up tho Perak River, close to Taluk-anson, by Mr. Turner from Province Wellesley. Tamil coolies are felling the jungle, and it is expected to start planting the canes shortly. Almost all the existing plantations have their sugar mills; while it might be mentioned that all the labour employed on the plantations is secured from South India.

CLIMATE AND RAINFALL.

While on the subject of planting it will not be ont of place to say a few words about the climate and rainfall. The climate is described as pleasant and healthy, and there is plenty of rain. In fact it might be said to be raining during the whole year with the exception of two months which are hot and dry. The rainfall is pretty evenly distributed through the whole year, and the country well watered. There is said to he very little malaria in the country.

AGRICULTURAL EDUCATION IN GREATER BRITAIN.

PAPER READ BEFORE THE FOREIGN AND COLONIAL SECTION OF THE SOCIETY OF ARTS, ON TUESDAY, FEBRUARY 27, 1900.

BY R. HEDGER WALLACE.

There can be little doubt that the interest taken in agricultural education generally is extremely widespread. The subject I find is not discussed by a few authorities alone, but seems to appeal to and attract the attention of the general public also. The title of my paper, I trust, indicates clearly the section or branch of the subject I intend to deal with, and I would ask that it be clearly understood that I do not approach it as an authority, agricultural or educational. My paper can be best described I think, as a compilation, in which an attempt is made to condense, in a form suitable for the general public, a large amount of data obtained from various sources. It is an attempt to answer such a common inquiry as, What are they doing in regard to agricultnral education in this or that colony ? I have no intention, therefore, of criticising either the work done or methods employed in the Colonies ; and may only venture into the domain of criticism when discussing the point whether a suitable training for colonial life can be obtained in this country, or whether it is desirable to take advantage of the educational facilities in agriculture offered in the Colonies. Here of course all citizens looking forward to the settlement in life, either of themselves or of menbers of their families, meet on common gronnd.

The subject of "Agricultural Education" generally has within recent years been twice (as far as I am aware) brought before the Society of Arts. First by Mr. J. C. Morton in 1887, and next by Professor Wrightson in 1888. In Mr. Morton's paper no reference is made to the Colonies at all, while Professor Wrightson only makes a passing allusion to Canada in his. Again at the International Congress on Technical Education held in London in 1897, at the invitation of the Society of Arts, there is no detailed reference, as far as I can find to the work done in the Colonies either in the papers read on "Agricultural Education" or in the resulting discussion. Some information however, can be gathered from the papers on technical education. In the period nnder discussion, I may add, there have heen qnite a nnmber of papers read and pnblished on "Foreign Agricultural Education" but their survey has been limited to the work done on the Continent of Europe or in the United States, and the Colonies have been left untouched. Yet there is one paper to which I must direct particular attention, namely, the paper by Mr. Henry F. Moore on "Agricultural and Technical Education in the Colonies" read before the Royal Colonial Institute in January, 1891. This exceedingly interesting and valuable paper, in its references to work accomplished in the matter of agricultural education in Greater Britain, covers the same ground that I do in this paper. In fact I shall attempt a similar survey, bnt I do it after an interval of ten years, and if a comparison be made, my paper will indicate, I hope, the progress accomplished in the Colonies and dependencies surveyed.

I have already stated that the general public are interested in learning what is being done in the Colonies in regard to agricultural education, and they are also keenly interested in discussions as to whether a suitable training for colonial life can be obtained at home or not. That such questions are really of general interest, and one not limited or restricted to the area in which dry-as-dust authorities and faddists profound and demolish the dogmatic assertions of each other, can be readily illustrated by references to our general literature as represented by our ordinary monthly magazines and reviews. I would in this connection refer to such articles as that entitled "Colonial Training for Gentlemen's Sons" in *Chambers' Journal* for 1885, to Mr. Montefiore's "Education for the Colonies" in *Macmillans' Magazine* for 1892, to the article by Frances Macnab on "The Production of Learned Pigs amongst the Poor" in *Temple Bar* for 1896, and to Mr. George J. Holyoake's article on "Emigrant Education" in the *Nineteeth Century* for 1898. The articles I have just named, and many similar ones that could be quoted, support I think, the view that my paper shonld be addressed to, and primarily intended for, the ordinary man, rather than for the expert. At any rate snch is the position I have adopted, and I hope these prefatory remarks will sufficiently explain.

When one snrveys the agricnlture of Greater Britain it is at once apparent that it can be grouped under two heads, *i. e.*, farming, farms, and farmers: and planting, plantations, and planters. That there is a difference between these two gronps will he at once recognised ; but to define when or how the distinction is made or can he drawn is by no means an easy matter. Generally speaking, however, it may be assnmed that a plantation is a large estate devoted to the rearing of tropical or semitropical crops—such as sugar-cane, tea, coffee, cotton, and tobacco—by the labour of an inferior or subject race. On the other hand a farm can be of any size and is cultivated by the labour of the owuer, assisted when desired by the labour of men of his own race, and the crops grown are those of a temperate clime. The distinction between a farmer and planter is so marked that it has been stated (in *The Times* I think) that the tendency or tone of a body of planters is to he exclusive and aristocratic, while on the other hand that of a community of farmers is generally democratic.

The technical education or training in agriculture of a prospective farmer and a planter (we suppose will be readily admitted), onght to differ a good deal, seeing that the work, for instance, of a tea planter in Assam differs wholly from every point of view from that of a farmer in Tasmania. As far as I am aware, however, no such dstinction is made in the agricultural training obtainable in this country: Some such specialised training is, I am aware, obtainable at Kew, hy gardeners, and a man going out from there to some tropical botanic station has already had some experience in the propagation of tropical plants specially those of economic value. Turning next to Greater Britain there also, unfortnnately, we find no facilities are provided for the agricultural education or technical training of the planter, such facilities as do exist in the tropical regions being intended entirely if not exclusively for the henefit of the native race. I believe, however, that under Dr. Morris's scheme of agricultural education for the West Indies opportunities are to be given to the younger generation of planters and sons of planters to study "the scientific problems which underlie the pratical work in which they are daily engaged."

There are many in this country, I think, who at some period in their life have had to ask themselves

the question—can a training for a life career in Greater Britain, as a farmer or a planter, be obtained in England? That for a planter is, I should say, practically unobtainable, as the soil, climate, vegetation, and conditions of life and work with us are not the same as in tropical and subtropical countries. Perhaps it is from this very cause that, as Sir William Des Voeux has pointed out, we are said to be most subject of all colonisers to entertaining delusions about tropical cultivation. "The luxuriance," he states, 'of the tropical virgin forests appeal to the colonising enthusiast chiefly as indicating possibilities of its succession by equal luxuriance of plantations controlled by planters." In imagination he sees the 'jungle,' 'bush,' or 'scrub' replaced by fields of sugar, cotton, or tea, judging in doing so, of the cultivation and vegetation of the tropics by the conditions common to the temperate zone. As regards planting then it would appear that the only education or technical training available is by the system under which young men are placed out with planters to be taught the management of an economic plant in all its stages, from the seedling in the nursery to the shipping home of the ultimate commercial product.

There still remains a part of the original question to be examined, namely can a training for farming in the Colonies be obtained in England? Those who intend to settle and farm in the Colonies can usually, I think, be divided into two classes—those who have been brought up in rural districts and from an early age have been accustomed to farm and manual labour, and on the other hand those brought up in urban districts unaccustomed to farm labour and often even to labour in any form. In a way, as far as I can gather, this distinction is to some extent recognised in this country. Those who are acquainted and accustomed with the practical work of agriculture can find institutions in England at which they can study simply the science of agriculture. At the same time those who have known acquaintance with the details of agricultural practice will be able to find institutions, where besides studying the theory of agriculture, they will also be instructed as regards its practical details, taking part in all the operations and processes which go to form the yearly cycle in farming. Turning now to the Colonies, what appears to be a general feature there is, that in the agricultural colleges of Great Britain it is assumed that the student who seeks instruction is unacquainted with practical farm work and, therefore, practical work or manual labour must be undertaken or performed by all and is a part of the instruction offered.

The agricultural settler in the Colonies as already indicated may have had a rural or an urban training. It is but natural, therefore, that these two differently trained men should approach the subject of "Agricultural Education" from two different standpoints. in the one case, considering that both the theory and practice of agriculture has to be learnt, it would seem that the most advantageous way to undergo such instruction would be in the college of the colony where settlement was intended. On the other hand one cannot but admit the justice of the other view held, namely, that the practical man who desires to study chiefly the higher scientific problems which underlie the practice of agriculture before he entered upon colonial life, would find it to his advantage to do so in England, where he can command the best teaching talent, material and equipment. Still there is one factor which must not be overlooked by the most practical man who has further benefited by an expensive agricultural education in England, and that is the time and money that must necessarily be spent by him, in obtaining colonial experience in the colony he has chosen. Colonial experience being a term which indicates the knowledge that is absolutely necessary for bringing undertakings entered upon with entirely new surroundings to a successful issue, and it includes experience in "the clearing of bush hands, the preparation of virgin soil for cultivation, the dealing with the heavy timbers of the colony, whether for use or destruction, the varied modes of cultivation and manuring consequent on the peculiarities of soil and climate and methods of clearing and reaping, the different systems of fencing, the handling of large herds of cattle and flocks of sheep. the local buying and selling of the stock and produce and the treatment of wool, timber meat, fruit, bark, butter and other produce for export." It will be readily seen therefore that this "colonial experience" is the difficulty that has to be surmounted and, of course, it will be just as readily observed that a training at a colonial agricultural college, theoretically. should give the knowledge and experience usually so much in demand and sought after.

This leads me to what is the main object in this paper—a survey of what our colonies and dependencies have attempted and accomplished in respect to agricultural education. I cannot pretend to be able to give a complete record of what is being done in the British Empire, but I have attempted by correspondence with the chief officials of our various colonies and dependencies, and by a careful study of numerous reports to be found in the libraries of the British Museum, Colonial Office, and India Office, assisted also by the good offices of the various Agent-Generals in London for our colonies, to gather together some authentic information on the subject.

Leaving England, then, and going to the great American continent, the first country there of importance for us is the Dominion of Canada. I have been favoured with a memorandum relating to agricultural education in Canada, which has been drawn up by Dr. Saunders, Director of the Dominion Experimental Farms as follows:—

"Information relating to agriculture in Canada is given to the farming community by both the Provincial and Dominion Governments.

"PROVINCIAL AIDS.

"1. *Agricultural Schools.*—Some of the provinces maintain agricultural schools for the practical education of young men in farming. The Ontario College of Agriculture at Guelph, Ont., is the best of these, institutions in Canada. It is well-equipped well managed, and has been in operation for about 25 years. There a large number of the sons of Canadian farmers receive practical training in their calling. An experimental farm is also carried on in connection with this institution. The full course of study covers a period of three years.

(*To be continued.*)

LESSONS IN TREE-PLANTING.

A class of blue-books that may be held to fully justify its existence, even in the face of recent criticism, is that relating to road-side arboriculture. As a rule departmental reports on this subject are at once concise, practical and instructive. It seems unfortunate, therefore, that advantages like these should not infrequently be neutralised by dilatoriness in publication. We have just received, writes the *Civil and Military Gazette*, two annual reports on road-side arboriculture in the Central Provinces, one for the year 1898-99, itself a sufficiently belated production, and the other for the year 1897-98. As it happens, the latter is intrinsically even more valuable than the former, and had it seen the light a couple of years ago, as it ought to have done, would doubtless have served important uses. Even at this late hour, however the book is still something better than waste-paper, and it may be that a province like Punjab which itself dabbles largely in tree-planting, can pick up some grains of counsel from the many failures and the few successes of the Arboriculture Department in the Central Provinces during the periods under notice.

The period 1897-98 embraced the worst half of the famine year, and although the closing portion was a time of recuperation, owing to the bounteous crops reaped in the autumn of 1897, still it was not to be expected that lost ground would be regained.

As remarked by the Commissioner of the Jubbulpore Division, "When the crops fail, road-side trees escape attention." The results of the year's operations

were, therefore, unsatisfactory. Planting operations, especially those conducted by private agency, were curtailed, and the maintenance of trees planted in previous years was a matter of special difficulty, owing to the drought that prevailed and the low level of the sub-soil water. But there were probably additional reasons for the comparative want of success. The Director of Land Records and Agriculture, who has watched the working of the present system for a number of years, seems disposed to question whether the allotments are always spent to the best advantage. Making due allowance for the unfavourable nature of the season, he thinks "we want more concentration of our resources, and at present money is frittered away in driblets to little effect." The annual expenditure of District Councils on tree-planting amounts to about R9,000 per annum, and as this money is distributed with impartiality rather than with discretion, each Local Board gets roughly the useless sum of R100 to spend on twelve months aboricultural operations. As a particularly bad instance of this excessive subdivision of allotments, mention is made of Hoshangabad district, in which an annual sum of R350 is split up to maintain six different nurseries. One, or at most two, nurseries should presumably suffice for all requirements, and by receiving undivided attention and financial support, would probably show much better results. On the other hand, as an instance of wise concentration of resources, Chanda district is cited, in which the entire annual allotment of R300 is to be devoted for the next few years to planting trees on a single trunk road: when the avenues on this road are duly established, and not till then, the District Council will consider other claims. Complaint is also made that the management of nurseries is often conducted in what is described as spasmodic fashion. The Nagpur nurseries, for example, contain 1,257 saplings, all of which have attained a growth of over three feet. When this defect was brought to light, and an explanation called for, the naive explanation was offered that no new plants were put down because the existing number of saplings was deemed sufficient. It had apparently not occurred to the apologist that many of the existing saplings might grow too old for transplantation before funds are available to plant them out on roads, and that what is required is a succession of plants in different stages of growth, the number ready for transplantation each year according, as nearly as possible, with the number actually required for planting out. It is clear that in the absence of some such arrangement arboricultural operations would shortly come to a standstill for want of saplings of the prescribed height, or, what is more probable, money would be wasted on putting down immature seedlings.

As already stated that the number of trees planted by private agency declined greatly during the few years of agricultural depression culminating in the famine of 1897. The only districts in which it was possible to enlist the co operation of private individuals are Bhandara, Balaghat, and Sambalpur. The assistance rendered in the two former districts was on a small scale, but appears to have been fairly effective. On this subject of tree-planting by private agency, the report for 1898-99 shows that there is much ground for dissatisfaction with the attitude of District Councils. In Nagpur the Chairman of the District Council states that "private persons show no desire to undertake the trouble of planting and rearing trees on the side of public roads." He, however, admits that the slackness of Local Board members in the matter has a good deal to do with the apathy. The Chairman, District Council of Wardha, remarks: "Private agency has again been found wanting. The history of the year under report is one more illustration of the futility of reliance on this source." The inference to be drawn from these remarks would seem to be that the people of Nagpur and Wardha are less fond of tree planting than those of more enlightened districts like Bilaspur or Bhandara. But as a matter of fact, this is not at all the case. The Officiating Commissioner of Settlements and Agriculture says: "I know from personal experience that trees have been planted in the past by private individuals on the sides of public roads, and there are no districts in which rights of ownership in trees are more keenly contested. If the Chairman of the District Council, or the Local Board member of the district, have ever stirred a finger to encourage private enterprise of this kind, there is no evidence to show it in their reports. In other words, where there is apathy at the top, there will be apathy at the bottom.

Now that most districts have come up for increased arboricultural allotments, it is more than ever necessary that the operations should be carried out in a methodical manner. To this end nearly all districts have been induced to frame schemes; but this alone will be of little utility unless more interest is taken in the subject by those responsible. The reports which accompany the statements are annually full of promises of what will be done "next year," but each year come confessions of neglet of rules. Money may be wasted on planting out immature saplings contrary to rule, but nobody is ever brought to book. Responsibility for failures must be fixed before much improvement can be manifested, and the conduct of arboricultural operations of any road should be as much the duty of the overseer or other official in charge of it, as the maintenance of the road itself. In the report for 1898-99 the Officiating Commissioner of Land Settlements says: "The orders of the Administration are contained in a Revenue Book Circular, but have the instructions which it lays down been communicated to the officials whose duty it is to carry them out? Plain instructions should be issued in writing to each official, and neglect to carry them out should entail his punishment. For instance, the gharra system of watering is laid down in paragraph 11 of that Circular; where it has been tried it has been found successful and economical; yet it was necessery to ask for information regarding it in nearly every district, and in many cases it is found that the system has never been tried, although enjoined in the plainest terms." Again, in the matter of enlisting private agency, the Circular prescribes the issue of a preliminary certificate when a tree is planted and of a sanad when it is established. But this procedure is hardly anywhere followed: it is flagrantly ignored. Every body acquainted with the lethargic character of petty landowners realises that it is almost useless to issue a sort of impersonal encyclical urging malguzars to plant trees in their own and the public interests. Individual officers must go to individual malguzars whose fields adjoin public roads, and use persuasive eloquence to stimulate them to plant trees. As long as people are assured that they will receive the fruit of trees which they may plant, and their titles are confirmed by the issue to them of the prescribed certificates and sanads, many will be glad to come forward. The Officiating Commissioner of Land Settlement and Agriculture writes: "I remember cases a few years ago when such persons were denied the ownership of the trees they had planted. This is, I hope, a thing of the past, but unless cerificates are issued in such cases, it is not unlikely that some ignorant road overseer may commit the same mistake, thereby effectually discouraging all private planting." This same critic says: "Some of the writers of the reports merely contend themselves year after year with lamenting the absence of private energy in the matter of tree-planting, but they never state what measures were adopted to enlist such efforts, or whether they themselves ever thought about it until the day that a draft report is put up for their signature." No doubt the present time is unfavourable for pressing the subject of road-side arboriculture. With famine imminent in many districts and a failing water-supply, arboricultural operations must necessarily be restricted. But there is no reason why, in such operations as are conducted, rules should be neglected, and neglect go unpunished, and the first essential is that every official in charge should know the rules and appreciate the consequences of neglecting them.—*Indian Agriculturist.*

COCONUTS AND NATIVE DEALERS.

JUDGMENT OF THE CEYLON SUPREME COURT.

Messrs. Justices Lawrie and Browne delivered judgment on March 16th, in the case in which Messrs. William Birch Junior & Co., Ltd., of Manchester, sued I. L. M. H. Mohamadu Mohideen of the Pettah. The plaintiffs alleged that the defendant consigned to them 625 bags of coconuts and drew on them a bill of exchange for £150. The coconuts had to be sold at a loss, and the plaintiffs sued the defendant for the recovery of £225—15—10 or its equivalent R3,427·03 due to them on this consignment. In defence the defendant pleaded that he suffered the loss owing to the neglect of the plaintifts, and admitted his liability to a sum of only £36—17—9. Mr. Dias, A.DJ., held that the loss was due to the plaintiffs' neglect, and condemned them in costs, giving them judgment only for the amount admitted. Their lordships gave judgment for the plaintiffs as follows:—

Mr. JUSTICE LAWRIE:—The defendant consigned a quantity of coconuts to the plaintiffs, a firm of merchants in England. Roughly speaking the agreement was that the plaintiffs should honour a draft for ¾ of the invoice price, that they should do their best to sell the nuts at a profit, that they should be paid brokerage and storage &c. and that they should be remunerated for their trouble; but as I read the agreement the consignors should bear the loss if the market fell or the articles did not find a purchaser. The speculation ended in a loss. The plaintiffs are out of pocket and they brought this action for payment. The defence is that the loss was caused by the neglect or want of skill or misconduct of the plaintiffs; that the plaintiffs ought to have sold the coconuts immediately or at least shortly after their arrival for 4s. per 100. They kept the consignment. The market did not rise for months and then so slightly as not to make up for the deterioration of the nuts. That is, fresh nuts were saleable at 4s. per 100 in December and though the price of fresh nuts rose in June or July to 5s. per 100, the price of stale nuts (as these had then become) was hardly 4s. and that the price obtained after so many months keeping was much the same as could have been got when they first arrived. The warehouse and other charges had accumulated, so there was a greater loss than if they had been sold for 4s. in December. Men are wise after the event and wish they sold when the market was higher, or bought when the market was lower. The defendant valued the coconuts at 8s. per 100. That estimate may have been justified by the prices quoted in September before the coconuts were shipped from Ceylon; but it is clear that the high price (8s.) induced many from the East and from the West to import nuts to England, that the market was glutted, the prices fell and 8s. per 100 could not be got after the nuts arrived. The defendant wrote to the plaintiffs to sell, but they did not say what sacrifice they were willing to endure; they did not say sell for less than 8s. If the letters implied that they would take a less price, they did not suggest that they would take half the value stated in the invoice. In my opinion the plaintiffs did not neglect the defendant's interest. At first, perhaps they were too sanguine as to a rise in the price. In January they showed they were not sanguine and they wished to bring the transaction to a close and they sent an account and drew on the defendant. They showed that at the prices obtainable there would be a loss. They asked to be relieved of the business and they were willing to transfer the account. An attempt was made to hand it over to Mr. Scrutton who did not agree to take the consignment over. Finally the plaintiff said that if the defendant did not make other arrangements they would sell for any price they could get. The defendant did not wire to prevent this. This speculation in coconuts valued at double their worth was bound to end in loss which the defendants have to meet. I would set aside and give judgment for the plaintiffs with costs.

Mr. JUSTICE BROWNE:—It appears to me that the learned Additional District Judge in declining to discuss in detail the evidence with regard to the state of the London Market for coconuts from Nov. 1896, when this shipment arrived, until May-June 1897, when they were sold, and in paying no attention whatever (so far as I can see) to the fact that from about the 22nd February until the 4th or 5th March, the defendant had placed the disposal of the shipment with another firm, has omitted matters of serious import in the consideration of whether or not the plaintiffs had failed in any duty or obligation by them to the defendant. The defendant certainly did not put any limit upon the price for which they should be sold in merely invoicing the nuts as at 8s per 100. It is to be noted, however, as to this consignment that the advice thereof preceded their arrival by only a few days, and that the shipment was in the less attractive forms of mixed unspecified sizes, instead of so many bags each of the sizes known in the trade as one, two and three, the first of which may have its subdivisions of large, extra large, and extra selected. Even had he therefore directed or had plaintiffs' broker desired to effect sales "to arrive" or "afloat," I find no reason to believe that such a sale would have been found easily practicable. The evidence as to the market rates shews me that after prices of 7s in Ocober and 8s in November there were such heavy stocks in London in December in readiness for the first of the four festivals, or festive seasons specified as those, when trade is most brisk, viz: Christmas, Easter, Whitsuntide, and August. That the highest price here proved to have been possibly obtainable in December sale would have been 4s 6d—5s 3d; but that practically there were no offers when these and other parcels were offered on 9, 11, 16, and 18 December, the nuts having been landed on 5th December, and that it must be taken that 4s—4s 9d was the best price obtainable before their arrival. The result to defendant of any sale that would have been effected then at 4s is shewn by plaintiffs' *pro forma* account of 14th January; it would have placed in plaintiffs' hands £17 16s 7s as against a draft for £150 which defendant had drawn against the shipment and plaintiffs had duly honoured. In spite of their having been offered at those 4 sales by a leading broker in the trade in December within a fortnight after arrival, the District Judge has held that "plaintiffs do not appear to have taken any steps whatever to dispose of them," and suggests that if on their arrival the price was only 4s the plaintiffs should not have honoured the defendant's draft. The consequence of that would probably have been that the Bank which bought the draft would either have simply redrawn upon defendant for the amount and let the nuts be sold to pay freight, or else have sold them with possibly a worse result than the *pro forma* account estimated, and in either case the defendant-consignor would have had no opportunity of seeing whether a less disastrous result could be arrived at ere he "ont his loss." When their broker reported to plaintiffs on the 4th January that there were no offers, were plaintiffs wrong in writing defendant and giving him a chance to make other arrangements? Or should they have sold at that loss? His letters to them of and after 23rd December, to effect speedy sales, had not then arrived, and they stood to lose about £130 upon this first venture of their new client, and had to keep a prudent watch over their own interests. Plaintiffs' manager says "it was unquestionably my duty not to sell in that state of the market," and in Frazer *v.* Vanderspaar Withers J., remarked, in the absence of authorities on the point, looking at the question from a common sense point of view:—"If a factor has the invoice prices before him and he finds that he can only put the consignment on the market for a price very considerably below the invoice price, it might be argued that he should communicate the fact to his principal who would either instruct him to sell for whatever price he

could obtain, or would demand the return of the goods subject to any lien for honoured drafts drawn against the goods and other legitimate charges." How defendant would have judged of plaintiffs had they so sold, may be considered from the fact that on receipt of their letter he did not wire "sell best possible price," and honor their drafts, thus making his loss then, but elected to try the market further per another agent, who on the 3rd March reported the nuts were then worth only 35s per 1,000, and declined to pay the draft and freight as a condition-precedent to their realising the invoice. No member of their firm however gave evidence for what "much better price" they could have sold them for the Christmas market. There is but little evidence (apart from Mr. Isaac's evidence as to sales "to arrive") of what the market rates were in and after March. They seem to have been 3/6—4/3. Even on the 25th March defendant wrote to plaintiffs "If you cannot obtain a better offer, deliver to Messrs, Scrutton. Owing to your non-experience in this line of business I had to suffer the loss." He evidently still believed that a better market could have been and might even then be found, and, in the same faith as he there wrote, has defended this action. But the evidence does not shew that this defence was well founded. One witness examined spoke chiefly, if not entirely of sales to arrive, which are more speculations than "Open Sales" and the other had no transactions in Dec.—May, except one in Feb. which was of assorted nuts and "to arrive." I have pointed out that defendant's general instructions to effect speedy sales were received after the plaintiffs had, as they thought it their duty to do, referred to him for instructions ere sacrificing the consignment at half the price he had anticipated, and I regard his action in desiring to see, could Messrs. Scrutton do better for him, and in not telegraphing or even writing "sell at once" is in itself approbating their having referred to him. I find no ground therefore for the strictures which the District Judge has passed in his Judgment on the plaintiffs. They appear to me to have taken all ordinary measures to bring the consignment to prompt sale, and defendant's loss is attributable only to the market being overstocked. I would set aside the dismissal, and enter judgment for plaintiffs as prayed for with costs.

THE RUBBER INDUSTRY.

At the sitting on Friday, February 23rd., in the House of Commons, Mr. Weir asked the Secretary of State for the Colonies, whether he was aware that the value of rubber imported from the British Central Africa Protectorate through Chiromo amounted during the year 1898-99 to £10,233 18s, as compared with £1,044 17s 6d in 1897-98, showing an increase of over £9,000 in one year; and would he state whether any efforts were being made to regulate the mode of collecting rubber juice, so as to prevent destruction of the rubber vines.

Mr. Brodrick, who replied, said,—Yes, it is so stated in the last report on the Protectorate. Regulations regulating the manufacture and sale of rubber were issued on September 1st last.

MORIB COCONUT ESTATES SYNDICATE, LIMITED.

Registered on February 23rd by Heath and Hamilton, 50, Lincoln's-inn-fields, W C, with a capital of £2,500 in £10 shares. Object, to acquire an estate in the district of Kuala Langat, Selangor, Malay Peninsula, and to carry on the business of coconut and rubber growers and merchants. The first directors (to number not less than three nor more than seven) are to be appointed by the subscribers. Qualification, one share.—*Financial News*, March 2.

CEYLON COMPANY DIVIDENDS FOR 1899.

(AS COMPARED WITH PREVIOUS DIVIDENDS).

The following table has to do with 24 Plantation (Tea) Companies, one for Coconuts and three Hotel Companies—28 Limited Rupee Companies in all. And it will be seen that, with very few exceptions, the dividends declared for these Companies for 1899 are better than for 1898. In only two instances do we find a less dividend paid; in six other cases the dividends for 1898 and 1899 are the same; while twenty Companies declare an improved dividend for last year over 1898. Here are the figures :—

	DIVIDENDS :					
NAME OF Co.	1899.	1898.	1897.	1896.	1895.	1894
	p. c.	p. c.	p. c.	p. c.	p. c.	p. c
Agra Ouvah	20	18	17	22	20	16
Bristol Hotel	8	8	5	10	10	10
Castlereagh	12	7	6	14	15	8
Clyde	2½	4	6½	8	—	—
Colombo Hotels	18	18	18	18	17	15
Galle Face Hotel	8	5	—	—	4	—
Gangawatte	6	8	10	—	—	—
Glasgow	18	15	15	17	18	18½
High Forests	5	4	2	2½	—	—
Horrekelly	5	6	5	10	7	5
Kalutara	7	2	—	4	—	—
Kanapediwatte	10½	9	9	—	—	—
Kelani Tea Gardens	5	2	5	5	—	—
Kirklees	6	4	15	13	12½	—
Knavesmire	5	2½	5	7	—	—
Maha Ouvah	8	6	8	9	16	8
Nahavilla	6	—	—	13*	—	20
Neboda	5	—	2	—	—	—
Ottery	8	7	7	10	—	—
Palmerston	5½	5	4	8	—	—
Pine Hill	5	4½	6	7	7	9
Putupaula	9	7	—	10	10	—
Rayigam	5	2	2	3	—	—
Roeberry	3	3	3	—	—	—
Ruanwella	3	3	—	5	—	—
Upper Maskeliya	8	5	9	15	18	20
Vogan	7	5	6	8	—	—
Yataderia	25 plus 20†	25	20	25 plus 7½†	25 plus 20†	25 plus 5†

* This is for 1895 and 1896. † Bonus.

THE RECEIPTS FROM THE TEA-DUTY have recently been at the rate of £160,000 per week, or just double that usually charged at the beginning of a year, says the *Grocer* of Feb. 17th. This represents a clearance of about 720 tons per day, or a quantity sufficient to last the public two and a half days. The cold weather has caused a considerable demand for rum. In mild winters 90,000 gallons of that liquor is consumed, for the past few weeks 140,000 have apparently been required to help to counteract the action of frost. Possibly the existence of the suspicion that the duties on spirits will be raised may have something to do with these increased clearances from bond; but as the Budget is two months off, merchants are not likely to lose the interest on the duty for six or seven weeks if they can help it. Cocoa is advancing in popularity at a great rate; for the month of January, 1897, the consumption was 1,082 tons, in 1898 the month's demand was 1,400 tons, in 1899 the quantity was 1,670 tons, last month it had risen to 1,830 tons.

BIG CEYLON TEA CO.

COOPER COOPER & JOHNSON.

DIRECTORS' REPORT—NO DIVIDEND ON THE ORDINARY SHARES.

The report of the directors of Cooper Cooper and Johnson, Ltd., for the year ended 30th June, 1899, to be submitted to the ordinary annual general meeting to be held in London on 6th prox. states that the difficulties of effecting the transfer of so many estates and businesses, and their organisation as a whole, have been very great, but the directors consider that the company has now been brought into good and economical working order, with steadily improving results. During the first part of the year under review the management of the estates acquired by the company was not in their hands, but after the transference had been effected and other matters in London settled, Mr. E H Hancock proceeded to Ceylon, on behalf of the company, to make the necessary arrangements for combining and working the estates. The Board, being subsequently dissatisfied with the way in which the Colombo agency was being managed by Messrs. J J Vanderspar and Co., instructed Mr. Hancock to pay special attention to that matter, and eventually particulars of such a nature came to the knowledge of the Board as to render, in their judgment, a change of agency necessary in the interests of the company. This change was made, but unfortunately disputes have arisen on accounts and otherwise, the details of which the directors are unable to go into, the matter being still sub-judice. The non-receipt of the accounts from Ceylon has caused the delay in preparing the accounts of the company. Mr. Hancock spent six months in visiting Ceylon, and making arrangements on the estates, which have already resulted in a more efficient working, by which the cost of the tea has been reduced and a considerable saving effected in every way, and he reports most favourably on the future prospects of both tea and cocoa estates. The amount of tea produced up to 30th June was 2,100,302 lb. and it is estimated that the production for the current year will be 2,322,000 lb. at a reduced cost per lb. The cocoa estates, from various causes, including unfavourable weather, showed disappointing results, but advices received to date show that a larger crop may be expected this year. The wholesale business shows satisfactory results. The business acquired from Messrs Cooper Cooper & Co., Ltd., has been a serious disappointment under the late management, but it is now showing better results under new direction, and there is reason to hope that it will prove a satisfactory source of revenue to the company in the future. The late managing director ceased to control the business in May, 1899, and subsequently resigned his seat on the board. The directors regret that owing to the results shown by Cooper Cooper & Co.'s business, and to the poor cocoa crop, they are unable to recommend a dividend on the ordinary shares for the year ended 30th June, 1899. It will be seen from the accounts that the net profit in working the properties is £23,068. After deducting general expenses and interest £9,001 remains, out of which preference dividends amounting to £6,996 have been paid, leaving a balance of £2,005 to be carried forward. The directors are pleased to say that Messrs. Antony Gibbs and Sons have undertaken the London agency of the estates. It has been decided that 1st April and 1st October are more convenient dates for the payment of preference dividends payable in respect of profits made up to 31st December and 30th June, and a resolution will be proposed to that effect. Messrs. A A Clark, M P Evans and Clive Meares have retired, and Messrs. G L Davies and Hector F Monro have joined the Board, and the shareholders are asked to confirm their appointment. Messrs. John Young and H A Hancock retire. The former does not offer himself for re-election owing to ill health.

WORKING ACCOUNT.

To loss on Cooper Cooper and Co.	£2,829
,, Balance carried to profit and loss account	23,068
	£25,897
By profit on estates	£20,750
,, Profit on Johnson, Dodds and Co. ..	5,141
	£25,891

PROFIT AND LOSS ACCOUNT, for year ended 30th June, 1899.

To rent salaries, accountants, general expenses and income-tax	£2,195
,, directors' fees	1,150
,, legal expenses	923
,, interest	1,720
,, debenture interest to 30th June, 1899 ..	8,155
" preference dividend to 30th Jnne, 1899 ..	6,996
,, balance, being profit carried to balance-sheet	2,005
	£23,144
By balance brought from working account...	£23,068
,, transfer fees	76
	£23,144

BALANCE-SHEET, as at 30th June, 1899.

LIABILITIES.

To Capital authorised—		
170,000 preference shares of £1 each	£170,000	
170,000 ordinary shares of £1 each...	170,000	
	£340,000	
To Capital issued—		
156,122 preference shares of £1 each...		£156,122
167,468 ordinary shares of £1 each..	£167,468	
Less calls in arear	30	
		167,438
,, Forfeited shares—amonnt paid on ..		469
,, Calls overpaid		—
		£324,029
,, 5 per cent. first mortgage debenture stock..		206,800
,, Sundry creditors—secnred ...	£33,254	
,, ,, unsecured ...	44,344	
		77,599
,, Estate account creditors		6,491
.. Trade creditors		32,573
,, Profit and loss account		2,005
		£649,497

ASSETS.

To Goodwill and assets acquired by the company, inclnding freehold and leasehold properties, plant, machinery, fixtures, carts, horses, &c., less depreciation of leases, plant, &c., &c. ..		£544,556
,, Capital improvements		1,981
,, Office furnitnre		81
,, Estates' debtors		17,979
,, Sundry debtors		1,426
,, Trade debtors		39,648
,, Stock		32,511
,, Coast advances		4,624
,, Debenture issue account		2,335
,, Cash in hand ..	£378	
,, Cash at bankers ..	3,978	
		4,356
		£649,497

BEES AT KANDY.

It is a strange fact that regularly once a year a swarm of bees form a hive on the huge beam supporting the verandah of the upper story of Messrs. Walker, Sons and Company's premises in Ward Street. The attraction of bees to this particular beam is strange and on Friday last a multitude of them settled themselves once again on this their favourite spot and yesterday morning the unruly hand of some mischievous lad in all probability disturbed the insects which caused great commotion in Ward Street. The bees commenced stinging every passer-by. Several native men, women and boys were attacked and it was amusing to see them running along the streets, many of them with the bees sticking on to their heads or faces. Mr. Elton, Private Secretary of Sir Winfield Bonser, Chief Justice, was one of the victims. He was riding up the street on his bicycle when he was stung by one or two on his face and throwing his cycle aside he ran up to the pavement and fortunately found himself in the Central Dispensary. There the Dispenser applied some soothing remedies and in a few minutes he left the place. He was seen in Court, in the afternoon, however, with marks on his face. It would be to the safety of the passers-by if the bees were smoked out of the place.—*Cor.*

PRODUCE AND PLANTING.

ADVANCE DUTY PAYMENT ON TEA.—The general order of the Custom House Board requiring the immediate withdrawal from the bonded warehouse of goods on which duty has been paid is as follows: "General Order 14, 1900.—Custom House, London, February 19, 1900.—Duty-paid Goods: Prompt Removal from bonnded Warehonses.—The Board, in concurrence with the Board of Inland Revenue, direct that the following paragraph be inserted in the Warehousing Code, after paragraph 489: '489A. The sole purpose for which a bonded warehouse is approved and appointed by the Commissioners of Customs or Inland Revenue is to secure keeping of dutiable goods before and until the payment of duty or exportation, and subject to any permissible operations therein; and the bond taken from the sureties of a warehouse-keeper is to secure the payment of duty upon such goods. It follows that the retention in a bonded warehouse of dutiable goods after duty has been paid thereon is to turn the warehouse to an illicit use. 'Warehouse-keepers and owners of bonded goods must therefore be made to understand that the payment of duty entails an obligation to remove forthwith from bonded premises the goods in respect of which such duty is paid Collectors at outports, and the inspectors in London are directed to make this Order known to the several warehouse-keepers within the respective ports and, in order to facilitate this notification the new paragraph will be printed separately for distribution and copies can be had on application in the usual manner to Division II. of the secretary's office.—By order of the Board, R T PROWSE." One effect of this general order will be that it will be difficult to cover the risk of any large increase of tea duty by paying the duty and leaving the goods in the warehouse.

THE OUTLOOK FOR COFFEE.—Coffee planters would be glad to hear that there was foundation for the statements made in some quarters that the consumption of the berry was increasing at a rate that threatened to overtake the production. Statistics do not bear this out, however. Messrs. W. H. Crossman and Bros., of New York, in their circular of the 9th ult., estimate that the Brazil crops of Rio and Santos coffee together will swell to an aggregate of 37,663,000 bags for the four seasons from July 1, 1896, to June 30, 1900, as contrasted with 22,682,000 bags for the same number of seasons between July, 1892, and June, 1896, a growth in the production of about 15.000,000 bags in four years. According to Messrs. Crossman's statistics, the total deliveries of the Brazil description of coffee in the United States during the four seasons ended June next will approximate to 22,807,000 bags in comparison with a previous four years' delivery (1892-96) of 17,432,000 bags, which is tantamonnt to an enlargement of 5,375,000 bags in one country alone. Turning to Europe for the same periods we find that the deliveries of coffee of all kinds (including Brazil) will probably amount to 32.178,000 bags, in lieu of the 26,439,000 bags delivered in the interval prior to 1895-96. The difference in this case is clearly shown to be 5,739,000 bags, but still on the favourable side, and makes the total gain in the quantities of coffee cleared from the stocks on hand in Europe and the United States equal to 11,114,000 bags in the short space of four years. It will thus be seen that, although the increase in consumption is considerable, it falls short by nearly one-third of the extra 15,000,000 bags produced in the corresponding period of time. There is not much chance therefore at present of a failure in the world's supplies.—*H. & C. Mail,* March 2.

THE LONDON COCOA MARKET.

BY HAROLD HAMEL SMITH.

London, March 5.

In comparison with the total business done in cocoa since last mail, this has been quite a "Ceylon week," for of the 4819 bags of all growths offered this week for public sales, 2,163 bags were Ceylons, and of the 2,200 bags sold at and after the sale Ceylons accounted for at least 1,400 of them, so the island has had a good share of attention

On the whole it has been a quiet week, the sales were made up of 2,163 bags Ceylons, 1,682 bags Trinidad, 363 Dominicas, 300 Guayaquil, and about 300 varions. The continued pressure caused a further drop in Trinidads, in the lots sold, whilst some of the bids were very low, and out of proportion to others. The market generally was evidently not wanting this growth as there was an absence of competition when it was offered: middling to good red sold at 75s to 78s, and some marks since the sale realised 80s. The Ceylons received much more attention and sold at 64s 6d for native, 56s to 68s 6d for smalls, 69s to 75s for middling to fair, 76s to 83s 6d good to fine up to 90s for very fine. At times the prices were a little irregular —but on the whole steady, except for the cheaper growths.

The shipments from Trinidad up to the 14th Feb. were only 3,146,000 bags against 6,217,000 bags last years. It is hoped the difference will be much less by July, and what the crop will be after that it is too early to say. Although the Venezuelan cocoa is coming in fairly well just now, it is said that owing to the Revolution, cultivation is neglected, many of the labourers are away, and the bush is growing very high, all of which is bad for the crop.

Thanks to the courtesy of the selling brokers I was able to ascertain that the L R C (Trinidad) cocoa of which I sent you a sample, and which had been here since March 1898 had lost 18 ounces (eighteen ounces) a bag of 1½ cwt. during that period and the charges amounted to 13s 9d per bag. There are 5,210 bags Cocoa (all growths) advertised at present for sale next week.

TEA TWADDLE.

Apparently the increasing popularity of Indian and Ceylon teas in the United States is causing uneasiness among certain sections of the grocery trade which have been vending the Chinese product with profit in the past. There have been many tirades written against the cup that cheers without muddling one's brains; but one does not look for twaddle from persons who are credited with intelligence. Doctor Kellogg, who "runs" a sanitarium at Battle Creek, in Michigan, U.S.A., with branches at Calcutta and Darjeeling, seems to have outdistanced all previous detractors of tea. According to Doctor Kellogg, tea "is a most dangerous drug." He tells of servant girls arrested in the streets of Boston for being drunk and disorderly who had tasted no alcohol, but who had "chewed tea constantly;" also, of an old lady in Minneapolis who drank thirty or forty cups a day and ended her life in a lunatic asylum. But even worse than these cases are those in which tea plays a more silent and insidious part. Among women it produces a kind of mania—"the mania for acting the persecuted saint." Among men, unlike the much-condemned alcohol, it produces fear. "One patient who was suffering from tea poisoning in this way never passed a high building without looking up to see if something was going to fall upon him. Tea is responsible for sleeplessness, and, in fact, most of the ills which flesh is heir to." This is the kind of language one expects from the illiterate. However, tea will go on making its way in public favor so long as men like Lord Kitchener sing its praises as the best sustainer for fighting men.—*Indian Gardening (Calcutta.)*

[Similar tactics are employed to win favor for imitation coffee and other articles. It is a wonder that retail grocers will put into stock articles made by parties who persistently and systematically discredit staple and universally used articles in order to create a demand for some cheap and enormously overvalued substitute or rival brand. There is need of reform in this direction. Some makers of gelatine seek to win favor for their brand by discrediting all other makes. Some manufacturers of soap hint that rival makers use stock of an obnoxious character. This sort of publicity leads people to ignore all goods of the class attacked, and thus injures the demand in all directions. The retailers have a remedy within control by throwing out of stock goods made by manufacturers who persistently attack quality.—ED. *American Grocer.*] Feb 14.

BRAZIL COFFEE NOTES.

Should the French Government impose double its present import duties on coffee, who will suffer most? In our opinion the French people will hardly care to pay the cost, nor will they wish to do without coffee. Brazil will suffer, of course, but less perhaps than France.

The minister of industry has advised the director of the Central railway that he has assented to the petition of the coffee commissarios to be relieved of the obligation of having their coffee sent to a central deposit. They can hereafter take their coffee to their own deposits.

The ship "Somali," which cleared for New York on Thursday, takes a cargo of 82,169 bags of coffee, shipped by Messrs. J W Doane & Co. of this city. This is not only the largest cargo which has ever left this port in a sailing vessel, but is the largest that has ever cleared in any vessel with but one exception. And in the case of the exception, the cargo came partly from Santos, while the "Somali's" cargo was entirely made up here and was shipped by one firm—probably the largest single shipment on record.—*Rio News*, Feb. 6.

THE "TROPICAL AGRICULTURIST": A COMPLIMENT.

(From Mr. Montague Kirkwood, Japan.)

I have always read that excellent periodical with the greatest interest and consider it invaluable to all those who desire information of a thoroughly practical nature with regard to agriculture and kindred industries in tropical or semi-tropical countries. If you have not already done so, you would do well, I think, to bring it prominently to the notice of the American officials and merchants and planters, who are now engaged in the development of the Philippines. Should you forward copies to the "President of the United States Commission to the Philippine Islands," you are at liberty to say that you do so "on the recommendation of Mr. Montague Kirkwood of Tokyo, who has furnished Reports to the Commission in regard to the Government of Britain's Dependencies in Asia."

PORTMORE TEA COMPANY OF CEYLON.

Report of the Directors submitted at the Third Annual Ordinary General Meeting of Shareholders, held at 24, Rood Lane, London, E C., on Thursday, 8th March 1900.

The Directors have the pleasure to submit the General Balance Sheet and Profit and Loss Account for the year ending 31st December, 1899, duly audited.

	£ s. d.	£ s. d.
The net amount at credit of Profit and Loss after providing for general expenses, Income Tax, &c., and writing off New Clearings and Withering Shed £166 11s. 6d is		4,393 11 4
To which should be added Balances forward from former years, viz:—1897 ...	116 16 7	
1898	367 5 8	
		484 2 3
		4,877 13 7
An Interim Dividend of 5 per cent was paid September 18th, 1899, amounting to ...	2,000 0 0	
It is proposed to pay a final Dividend of 6 per cent (making 11 per cent in all, free of Income Tax) which will absorb	2,400 0 0	
And to carry forward to next year	477 13 7	
		£4,877 13 7

In presenting their Third Annual Report, the Directors have pleasure in recommending a dividend of eleven per cent.

The yield of tea has been 242,740 lb., being at the rate of 510 lb. per acre, the cost of production has been £4,249 15s 9d being at the rate of 4d 201 per pound, and the crop has netted £9,024 10s 1d, being 8d 92 per pound, equal to a profit on the capital of the Company of 11·93 per cent.

The lower price realized for the tea has not been due to any falling off in quality, but to the unprecedented demand for common tea which has existed during the past year and which has withdrawn the attention of the market from higher class teas.

The average rate of exchange for year has been 1s 4 13-64d against 1s 4 5-64d during 1898.

Mr. W. Herbert Anderson retires from the Board by rotation, but being eligible offers himself for re-election.

The latest reports from the Manager in Ceylon describe the estates, buildings, and machinery as all being in good order, and the estimates of crop and expenditure for the current year give promise of continued satisfactory results.

The Directors desire to express their unqualified satisfaction with the manner in which the Manager and the Superintendent of the estates in Ceylon have discharged their duties during the year.—By order of the Board,

SHAND, HALDANE & Co., Secretaries

THE GANGAWATTA ESTATES COMPANY OF CEYLON, LIMITED.

THE ANNUAL REPORT.

ACREAGE:

Tea in full bearing	..	335	acres.
„ partial bearing	..	2	„
„ not in bearing	...	8	„
Grass and Ravines	..	10	„
Total	..	355	acres.

The Directors beg to submit their third annual report and statement of accounts for the year euded 31st December, 1899.

A visitation of blight on some of the best yielding fields has cau ed a shortfall to the extent of 10,000 lb. ou the crop, and the result has been a yield of only 140,025 lb. against 150,000 lb. estimated.

Prices have been slightly better than last year, and the average is 40·16 cents per lb. while the cost of production works out at 27·06 cents per lb. including 2·70 under the head of manure.

The working account shows a surplus over expenditure of R18,343·92 which, after allowing for interest on mortage, amounts to a little over 9 per cent on the capital. Out of this, however, we have had to spend R3.316·95 for permanent improvements for which there was no capital provided, and that, with an uncovered balance under the head of coast advances, has somewhat crippled our funds. The expenditure on manuring was absolutely necessary, and it is proposed to treat a third of the acreage annually with artificial manure.

An interim divideud of 3 per cent has already been paid, and the Directors now propose a final dividend of the same amount, making 6 per ceut for the year.

After payment of this, the balance remaining at credit of profit and loss account will be R3,996·33 subject to deduction for directors' fees, and it is proposed that this should be carried to an extension account against the capital expenditure this season above alluded to.

Mr Hayes reports that the properties are in good order.

The estimate of crop for 1900 is 160,000 lb. and of expenditure R43,060 which includes an outlay of R5,175 for manuring.

In terms of the articles of Association Mr. Anderson retires from the office of director, and offers himself for re-election.

The appointment of an auditor for the current year rests with the meeting.

NAHAVILLA ESTATES COMPANY, LD.

ANNUAL MEETING.

The Directors beg to present their Report for the year ended 31st of December, 1899, together with a Statement of Accounts for the same period, which have been duly audited.

The Tea Crop amounted to 377,376 lb, against an estimate of 345,000 lb, and the Coffee Crop also exceeded expectations, 1,786 bushels having been secured in place of 1,360 bushels estimated.

Prices obtained for the Nahavilla Teas have been very satisfactory, but the Ury Factory shews a falling off from last year, which may have been partly caused by insufficient withering space. Further accommodation has now been provided, bnt more is still needed to meet the requirements of an improving yield. The general average price for all the Estates combined amounts to over 40 cents per pound.

The cost of producing the teas and placing them on the market is 30·32 cents per lb. and is less than in previous years. The rates, moreover, should continue to decrease as the young fields of tea come into bearing. A distinct improvement has taken place in connection with the working of Galella, but the estate has still to meet the cost of manufacturing its teas at a neighbouring Factory, and the ordinary expenditure this season also iucludes a payment of R1,698·36 on account of the new Cart Road.

The total working profit from the four Estates for the year under review, amounts to R50,076·72. which is equal to about 10 per cent on the capital of the Company after allowing for interest ou the mortgages.

The Profit and Loss Account, after paying interest on Mortgages and other charges, shows a balance of R50,828·62 at credit. Out of this a sum of R15,239·47 was brought forward from last year to meet previous extensions, and we have spent R24,645·02 under that head this season.

Your Directors recommend that a Dividend of 6 per cent be declared, absorbing R23,790·00; and that the balance, after providing for Directors' fees, and a Bonus to the Superintendents of Nahavilla and Galella which has been omitted should be carried to Extension Account.

The latter account will then be well in funds as regards past outlay, but further extensions are still imperative to the Factories and Machinery on Ury and Nahavilla, even if it be decided not to have a Factory on Galella. The upkeep of a considerable extent of tea not in bearing must be provided for, and there is also much available land which ought to be planted in order more fully to develop the estates. There is, moreover, a large lock up in Coast advances which has to be met, and your Directors will have to consider how capital can best be raised for these purposes. The requirements are judged to be too large to admit of their being wholly met out of revenue without unduly depressing dividends.

The new Season's estimates point to a yield of 420,000 lb. of tea and 750 bushels of coffee against an outlay of R129,564·00, and under normal conditions of weather it may be hoped that these crops will be fully secured.

ACREAGE.

	Nahavilla.	Ury.	M. P. G.	Galella.	Total.
Tea in full bearing	...251	209	195	294	949
Tea in partial bearing	72	155	22	—	249
Tea not in bearing	... 50	163	35	3	251
Coffee	...112	41	—	—	153
Forest	... 45	66	5	72	188
Grass, Fuel trees and Patna	... 71	132	84	244	531
Total	...601	766	341	613	2,321

Mr. Anderson retires from the Board of Directors by rotation, and is eligible for re-election.

The appointment of an Auditor rests with the Meeting.

THE CAMPHOR TREE.—In reply to the question, "Is the camphor tree grown in California?" the editor of the *Rural Press* replies thus:—The camphor tree has been grown for many years as a shade and ornamental tree, but no effort has thus far been made to produce camphor upon a commercial scale. At the State University, some years ago, a small sample of camphor was made from the twigs and foliage, and was exhibited at the fairs as a matter of common interest. The trees are very widely distributed over the State of California, both along the coast and in the interior, and everywhere are much admired for their thrifty growth and natural beauty. There are trees, probably nearly forty years of age, sixty feet in height, and three feet in diameter at the base. No large plantations have been made, but only scattering trees here and there.

PLANTING NOTES.

STABLE-MANURE FOR POTATOES.—According to some experiments carried out for the Wilts County Council, a more profitable crop was obtained with the use of stable-manure, at 5s a load, than with artificials. The stable-manure undoubtedly enabled the plants to resist the effects of the drought of the last two seasons.—*Gardeners' Chronicle*, Mar. 3.

BORDEAUX MIXTURE AND THE POTATO DISEASE.—According to the experiments made on behalf of the Wilts County Council, the average gain from the use of Bordeaux Mixture as a preventative of the Potato disease amounted to over £2 10s per acre. The application is specially valuable to late varieties. Two applications are generally necessary, the first being most advantageous, whilst no benefit accrued from a third spraying.—*Gardeners' Chronicle*, Mar. 3.

THE "COCONUT" DISPUTE, with the judgments of their Honors Justices Lawrie and Browne on page 731, ought to carry a lesson to local consignors of produce to London who (if Ceylonese especially) are sometimes inclined to think that if they ship and draw on the bills of lading at their own estimation of value, there is an end of the transaction. In the present case, the consignor not only gets nothing for his 625 bags of coconuts; but he will be out of pocket £75 15s 10d, besides the costs of both sides in the case in the District Court and in appeal. Pity such coconuts were ever shipped; but then it is too late to cry over what is irretrievable.

A CURE AGAINST DYSENTERY.—The Colonial Garden in Indo-China, through the good offices of Senator Pauliat, has received some seeds called "Ko-San" by the Chinese and employed by them as a preventive against dysentery. Dr. Mongeot, of Saigon, had the happy idea of utilising these seeds according to the Chinese methods, and the results have been very satisfactory. Out of 879 cases experimented upon, he met with only eight unsuccessful results. Experiments made at the Colonial Garden have shown that the seeds had a powerful physiological action. New experiments will, no doubt, enable the cause to be traced, and the effects of the action determined. If, as everything seems to point to it the utility of this Ko-San seed is confirmed, the plant will be spread all throughout the French Colonies.—*Singapore Free Press*, March, 8.

COFFEE HULLING: DUTCH EAST INDIES.—The coffee planter has always been very desirous of finding a huller which, whilst not deteriorating the bean, would at the same time be able to deal with different kinds of coffee. The problem has now been solved by M Schaap, one of the planters, who has invented a machine which can hull all the kinds of coffee grown in the colony. At the last coffee planters' congress held at Malany in October, 1898, a prize of 2000 florins was voted for the improvement of Schaap's system which could be made lighter, more economical in motive power, and able to treat at least three piculs per hour. Coffee hullers come generally from England and Germany, but on many plantations this work is still done in a very rudimentary way. The U.S.A. are now introducing machines made by the "Engelberg Huller Co." of Syracuse, New York; they are giving great satisfaction and will soon become very widely spread.—*French Official Report from Java.*

COCONUT CULTIVATION IN SELANGOR.—Says the *Perak Pioneer* (March 7th) in an article on the Annual Report of the Selangor Planters, Association :—Under the heading of *coconuts* the report records the testimony of Ceylon experts, that the F M S product is finer than anything obtainable in that island. This betokens an unmistakeable influx of Ceylon coconut planters in the near future. The coconut oil, fibre, and rope industry, are already under development in the Straits and F M States. Hitherto, Rangoon and Calcutta have received a very large percentage of our coconut produce, for the purposes specified. The order of things now existing, promises therefore and very rightly so, to be revolutionized. The sooner the better say we, for, when its products are reproduced in a country, its welfare is undoubtedly on the incline. A mighty industry in the coconut and its products may therefore be safely predicted, for the regions bordering on and contiguous to the Straits of Malacca.

COOPER, COOPER AND JOHNSON.—On page 733 we give the annual report of this well-known Ceylon Company in which it is stated that the concern has now been brought into good and economical working order. *Commerce* however considers it very disheartening reading for the shareholders and adds :—

An addition is made to the melancholy list of industrial companies which have failed to come up to the promises of their prospectuses. They ought to have done well. For not only have they the advantage of growing their own teas, but they sell direct to the consumer, and thus save those intermediary charges which add such a serious burden to the tea trade. The document states that the difficulties of effecting the transfer of so many estates and businesses, and their organisation as a whole have been very great, but the directors consider that the company has now been brought into good and economical working order, with steadily improving results. During the first part of the year under review the management of the estates acquired by the company was not in their hands, but after the transference had been effected and other matters in London settled, Mr. E H Hancock proceeded to Ceylon, on behalf of the company, to make the necessary arrangements for combining and working the estates. The board being subsequently dissatisfied with the way in which the Colombo agency was being managed by Messrs. J J Vanderspar & Co., instructed Mr. Hancok to pay special attention to that matter, and eventually particulars of such a nature came to the knowledge of the board as to render, in their judgment, a change of agency necessary in the interests of the company. This change was made, but unfortunately disputes have arisen on accounts and otherwise, the details of which the directors are unable to go into, the matter being still sub judice. The non-receipt of the accounts from Ceylon has caused the delay in preparing the accounts of the company. Mr. Hancock spent six months in visiting Ceylon, and making arrangements on the estates, which have already resulted in a more efficient working, by which the cost of the tea has been reduced and a considerable saving effected in every way, and he reports most favourably on the future prospects of both tea and cocoa estates. The amount of tea produced up to 30th June was 2,100,302 lb and it is estimated that the production for the current year will be 2,322,000 lb at a reduced cost per lb. The cocoa estates, from various causes, including unfavourable weather, showed disappointing results, but advices received to date show that a larger crop may be expected this year. The wholesale business shows satisfactory results.

We also reproduce a letter to *The Financial Times* in which the opinion is expressed that it is a case of too much Hancock.

RICE-GROWING IN LOUISIANA, U. S. A.—Japanese Kiushu rice is now grown in the warm prairies of south-western Louisiana. Steam harvesters and thrashers are employed in the culture, and the kiushu is expected to bear the milling better than ordinary rice.—*Globe*, March 2.

TEA BULKING.—We understand that a consignment of some 5,000 chests of tea was recently bulked and tared at the Port Commissioners' godown by the aid of the Apjohn tea-bulker. This is a step in the right direction, and we hope to see the movement grow rapidly.—*Indian Gardening*, March 8.

TROUT CULTURE UP THE THAMES.—The trout eggs in the private hatchery erected by Mr. A. Burrow, at Staines, have now hatched out, and the young trout (Loch Levens) look very healthy. Out of 25,000 eggs put down under one hundred have been lost. The trout when old enough are to be placed in the Thames.—*Daily Chronicle*, Feb. 24.

A NEW FUNGICIDE.—In some French tests a fungicide composed of 3 lb. copper sulphate, 5 lb. copper carbonate ½ oz. of permanganate of potash dissolved in a pint of water and 100 qts, water, is said to have given as good results as the same quantity of Bordeaux mixture, and has the advantage of adhering to the foliage better.—*Planting Opinion*, March 17.

PLANTING IN THE STRAITS SETTLEMENTS.—In Malacca a good tea plantation has been thoroughly established, which finds a local market for its produce. An enterprising syndicate of Chinese has begun to plant rubber largely in that Settlement. In all the Settlements the cultivation of coconuts is progressing. In Malacca a very successful agricultural show was held. It is intended in future that there should be a show every year in some Settlement of the Colony. The Botanical Garden at Singapore continued to aid planters by seeds and advice. This station is a centre for British North Borneo, Sarawak, Labuan, Johore, the Federated Malay States, and even Siam, and there was very keen competition for all the rubber seeds which could be spared. Orders were booked for quite twenty times as much seed as was available.—*Colonial Office Report from Singapore.*

DOES TEA IMPROVE OR DETERIORATE BY KEEPING?—Some say that it improves, whilst others assert that it begins at once to deteriorate unless hermetically sealed. As a matter or fact, provided the tea has been thoroughly dried before packing and then carefully soldered in lead or tin, it will most certainly improve by age. This has been proved by planters time and again. We would remark, however, that even in the most (as we think) thoroughly dried tea there is always a certain amount of moisture retained, which, although imperceptible to us, is perceptible to the chemist or analyst. If the keeping qualities of the tea are to be preserved for any very extended period, the tea should not be packed whilst greatly heated, but allowed to gently cool in some *dry* place (so that it may not absorb moisture), and then be enclosed in its lead or tin-casing, which must be most carefully soldered, so that there may be no possibility of air entering it in any manner whatsoever. Such hermetically-sealed tea will not only keep as long as its casing survives uninjured, but will greatly improve with age. Once, however, its case is opened, its keeping qualities are impaired, and although it may be repacked at once, its contact with the air has deprived it of its properties of resisting deterioration for an indefinite period of time.—*Indian Planters' Gazette*, March 3.

FRUIT CROPS IN QUEENSLAND, 1900.—Acting upon instruction from the Queensland Under-Secretary for Agriculture, the Instructor in Fruit Culture attached to that department, has forwarded to us (under date January 15), the following interesting particulars connected with the fruit crops for the current season:—The last figures available show the following acreage and returns for the following fruits:—

Bananas ..	5264 acres ...	Produce	46,547,090 doz.
Pineapples	1.130 „ ...	„	462,752 „
Oranges	2,272 „ ...	„	1,527,469 „

The prospects of the present crop are as follows:—Bananas: The dry spring has somewhat retarded this crop, but recent rains have greatly improved it. Pineapples will be ready for marketing within a month; there is a good show of fruit on both rough-leaved and smooth Pines, and the recent rains will tend to improve the size, which promised to be small. Oranges are very patchy; some districts promising record crops, whilst others will be less than average. The same remarks apply Mandarins. Passion-fruit has been a good crop, as have also been strawberries and Cape Gooseberries. Mangoes are only a small crop in the southern part of the colony.—*Gardeners' Chronicle*, Mar. 3.

NEW DARVEL BAY (BORNEO) TOBACCO PLANTATIONS (LIMITED).—The seventh ordinary general meeting was held yesterday at Winchester-house. Mr. Sigmund Sinauer presided, and, in moving the adoption of the report, expressed a hope that the shareholders would consider it satisfactory. The company's tobacco, though of good quality, had the fault of being "spotted," and, moreover, the market had not been so favourable as in the previous year. They had received only 1s 10d per lb., against 2s 2¾d in 1898, and this difference had affected the profits to the extent of upwards of £12,000. The large quantity reaped showed, however, the capabilities of the plantations for tobacco cultivation. From the balance standing to the credit of profit and lost account, £13,938, including the amount brought forward, it was proposed to pay a dividend of 1s 6d per share, free of income-tax, and to transfer £4,000 to the reserve fund, leaving more than £1,000 to be carried forward. In addition about £6,000 had been written off for depreciation. The 1899 crop had been housed in the fermenting sheds and would soon be ready for shipment. Although in quantity it might not be quite so satisfactory as the 1898 crop, the quality was better. With regard to the prospects of finding gold on the company's property, he said that owing to the illness of the mining engineer development work had had to be suspended. Arrangements had been made with the British North Borneo Company for an extension of the concession for two years more, so that they had plenty of time in which to conduct operations. Since the engineer had resumed work he had reported that there were indications of something better than he had originally expected to find. A large quantity of conglomerate had been discovered in the sides of the bed of the river, and about 13cwt. of it had been sent home. Experiments on it had been made by three firms. Two of these reported that they could not find gold in payable quantities, but the other had given a more favourable report. The intention of the directors was to have a large quantity of the "stuff" sent home in order that a more thorough test of its value might be made. The shareholders might rest assured that the sum spent on making experiments would not be in excess of that already authorised. Mr. H. Hayman seconded the motion, which was adopted.—London *Times*, Feb. 22.

TEA IN THE ANDAMAN ISLANDS.

CONVICT-WORKED TEA GARDENS ;

DEAD LOSS IN EACH CASE.

An experimental tea garden was first commenced in the Andaman Islands in the year 1876, tea seed being planted in nursery beds in February of that year. Lieutenant-Colonel Berkeley took charge of the plantation on the 12th April, 1880, and found, on taking over charge, that the trees had growing very tall, some being as much as eight feet high. The experiment proved a success, and a source of profit to Government at the time. The "Report on the Administration of the Andaman and Nicobar Islands for 1898-99," just published, furnishes us with some interesting information relative to the present condition of tea cultivation in the Andamans. There are three tea gardens: one at Navy Bay, one at Goplakabang, and one at Kalating.

THE GARDEN AT NAVY BAY

was in charge of Mr. A J King during the year 1898-99. He reports that the season was very unfavourable, due entirely to unseasonable weather. The year opened favourably and continued so until the 8th of May. Unfavourable weather was then experienced for the rest of the year, with small breaks. The total area under plant is 301½ acres. No new land was cleared. The whole garden was as well cultivated as circumstances permitted, and portions were manured with cow-dung and castor cake respectively.

The outturn was 48,300 lb. only against 55,021 lb. during the previous year. The shortage was due to the very unfavourable weather experienced during the greater portion of the year, as also to inadequate supply of labour, whereby the necessary cultivation had to be restricted. The cost of manufacture averaged nine annas 2⅓ pies per lb., against five annas 10 pies per lb. during the previous year and five annas 8½ pies during 1896-97. There was a loss, as was to be expected. The report states that:—"The sale proceeds of 47,286 lb. was a little under six annas one pie per lb. against six annas one pie during 1897-98, so that the net loss per lb. equalled three annas 1¼ pie after charging for convict labour and local material in addition to cash expenditure. The profit per lb. during 1897-98 was three pies." The garden being Government property, situated in a penal settlement and worked by convict labour. it matters little whether it yields a profit or not as it is simply a case of taking money out of one packet and placing in the other. With regard to prospects, Mr. King states that if anything like favourable weather is experienced during the remaining months of 1899-1900, he anticipates manufacturing 64,000 lb. of tea. It is to be hoped, however, that this will again not be at a net loss of three annas per lb. The contract rate at which tea is supplied to the Burma and Madras Commissariat Departments is five annas 11·04 pies per lb. Mr. Minto held charge of the

GOPLAKABANG GARDEN

to the 2nd of February, 1899, when he proceeded on leave, handing over charge to Mr. A J King, who reports that the first eight months of the year under review were fairly favourable, This was followed by heavy rain, which did considerable damage. From December 1898 to the end of March, 1899, the season was most unfavourable, no rain falling. This was the longest and most severe drought experienced for very many years, and to this, and other causes, is due a deficit of 23,745 lb. in the outturn during the year. The chief cause, however, was insufficiency of labour. Thread Blight has also been steadily increasing yearly and causing great damage. The total area of this garden is 187 acres. The garden was cultivated as much as an inadequate labour force permitted. The yield of leaf taken off the nurseries was not good. The crop of tea manufactured was 25,460 lb. against an outturn of 49,205 lb. during 1897-98, showing thus a deficit of 23,745 lb. The cost of manufacturing the year's crop averaged 12 annas 7½ pies per lb. against 5 annas and 6¾ pies per lb. during the previous year. The sale proceeds of 13,192 lb. of tea, says the report, was 3 annas and 9½ pies *per lb.* against 5 annas per lb. during 1897-98, so that the loss per pound was 8 annas and 10 pies, against 6 annas and ¾ pies during 1897-98, after charging for convict labour cost of machinery and local material. Comment is superfluous further than to remark that we do not understand why this garden is not abandoned. The total loss on the year's transactions, according to the accounts submitted, was R16,976. Mr. A. J. King held charge

OF THE KALATANG GARDEN

also from the 2nd of February, 1899. This is an indigenous planted garden. The season, on the whole, was unfavourable. The area of the garden is 30 acres only. It was attacked by Thread Blight, which, however, disappeared after a time. The outturn of tea from this garden exceeded its estimate by 4,600 lb. The bushes were regularly clipped throughout the year, and the yield was 21,600 lb., as against an outturn of 16,830 lb. during the previous year. This yield gives for the 30 acres, 9 maunds per acre, a very satisfactory crop. The cost of manufacture was 3 annas and 5 pies per lb. against 3 annas and 4 pies per lb. last year. The sale proceeds of 13,480 lb. was 4 annas and 2½ pies per lb. against 4 annas 9½ pies per lb. during the previous year and 4 annas 9¼ pies per lb. during 1896-97, so that the net profit per lb. equalled 9½ pies, after all charges, against a profit of 1 anna 5¼ pies per lb. during 1897-98. The report, however, states that—"After deducting these book charges, the account exhibits a loss of R1,052 as compared with a net profit of R625 during 1897-98. This is said to be due entirely to the failure of the Burma Commissariat Department to fulfil its part of the tea contract. Mr. King expects an outturn of 22,000 lb. of tea during 1899-1900 if the conditions are at all favourable. Taken all in all the conditions of the tea industry as at present existing in the Andaman Islands are by no means inviting.—*Planter.*

PLANTING IN BRITISH NEW GUINEA.

Some months ago two young men asked me to give them some information on British New Guinea and what likely success would attend them on taking up a block of land. Within the last few days I obtained particulars from the Surveyor-General, Queensland, of land now open for settlement, and, as the price and conditions are so favourable, I have extracted from the document the following particulars:—The blocks of land on the south coast of the Central district range from 1,280 acres to 4,500 acres, and I classified as agricultural and pasturage. They are situated on Cloudy Bay, Cape Rodney, Velerupu River, Waipara River, and Kemp Welch River. In the Central district the area of the blocks range from 5,000 acres to 326,000 acres, and are situated on Brown and Laloke rivers, south of Laloke River, Vanapa River, Galley Reach, and Cape Suckling, and are similarly classified as the above. In the Western district only one block of 21,200 acres, on the Oriomo River, of agricultural and pasturage lands is gazetted. The price is subject to arrangement with the Government, but not to be less than 2s 6d per acre for agricultural land, free hold ; 6d per acre for pasturage land, freehold ; 6d per acre for agricultural land, leasehold ; 1d per acre for pasturage land, leasehold. The improvement conditions, also under the same conditions as price, are 2s 6d per acre agricultural land, to be effected within five years ; 2s per acre pasturage land, to be effected within five years, exclusive of residential buildings. The latter, in respect of large pastoral blocks, is far too excessive. For instance, on the 326,000-block advertised, which is classified agricultural and pasturage, the outlay would mean something like £40,000, or £8,000 per year. In the present state of progress no individual or company could see its way

to lay out such a sum and expect a profitable return from it. Most of the blocks are on open and undulating country, partially wooded. The climate is not worse than Northern Queensland: in fact, in the upland country the climate is healthy and bracing. I believe there is a good future for British New Guinea, and I hope that the land taken up will be in the hands of Australians only.—*Sydney Mail*, March 3.

PARA RUBBER IN THE STRAITS. A PROMISING OUTLOOK.

TO THE EDITOR "S. F. PRESS,"

DEAR SIR,—I have been asked by the Committee of the United Planters' Association F. M. S. to let it be widely known that a strong feeling exists amongst planters that the time is fast approaching when we should send a representative to Para and from thence to the different seats of the rubber industry in order that when this country is ready to put its own rubber upon the Market, we may be in full possession of all the most up-to-date methods of tapping, of obtaining the maximum output with the minimum of damage to the tree and of curing our produce in such a manner that it will fetch as high a price as any in the markets of the world. It has already been demonstrated that we can grow Para Rubber, that we can get a heavy yield, and that the quality of our produce is equal in value to the best Brazilian. These are now proved facts and there is no doubt that if we avoid all initial mistakes when cultivating and producing on a large scale, are thoroughly coached in our business when we first make our bow to the public and so gain straight off a reputation for quality, a very prosperous agricultural future lies before the Malay Peninsula.

I believe I am right in stating that the Rubber zone is approximately confined to 15° north and 5° south of the equator, and a glance at a map of the world will very soon show how exceptionally well situated we are in every respect by comparison with other rubber producing countries. Easy transport, a labour supply that can be developed until it is sufficient for our fullest requirements, a healthy climate where the white man and the coolie alike can thrive, all these advantages are ours; and I maintain that it rests with us whether we make a success of the great industry which we have inaugurated here or whether by carelessness and ignorance in our initial methods we find ourselves saddled with a reputation which it may take us years to live down

The Resident-General with characteristic sympathy, has promised the planters the assistance of an expert from Kew, and a substantial sum has been provided for that purpose on the Federal Estimates: no one doubts that the results of this officer's researches will be of enormous benefit to Malayan agriculture generally, but, with respect to Rubber, we believe that much additional good may be done by sending over to Para one of our own men, a thoroughly practical and energetic planter, and, making his experience the basis of our own methods, by steadily endeavouring to improve from that point. In Selangor during the year 1898, no less than 389,500 Para Rubber trees were planted and in 1899 the S P A Annual Report shows a return of 1,600,000. Previous to 1898 a fair number were planted too. Taking 1,000,000 then as likely to arrive at maturity and with a yield of 1½ lb. per tree which we may put at 2s, or say $1 to allow for a possible fall of 50 per cent in value, we have in this State alone sufficient Para planted to give us an annual return of $1,500,000, double this for the rest of the Malay Peninsula, and it is abundantly clear that we have already laid the foundations of what may with luck and care become an enormous trade

It will no doubt be objected that what answers in Brazil may not by any means apply here, but surely it is folly to assume this? We know next to nothing about our subject at present, and very soon most planters will be wanting to begin tapping on a small scale, let us find out then as soon as possible all that there is to be learnt and apply that knowledge to suit local conditions.

It has been estimated that to send a good man to Brazil with 'carte blanche' to travel as he thinks best and to extend his inquiries, if he get the opportunity, to other rubbers besides Para, will cost in all probability not less than $10,000. In these hard times this is a large sum to raise, and my object in writing is to invite public opinion upon the question. If those interested will communicate their views to the press much good may result and when the time comes for us to take definite action, the skeleton of the scheme will already have been framed.—I am, dear sir, yours faithfully, E. V. CAREY,

Chairman, United Planters' Association,

Klang, 13th March, 1900.

Singapore Free Press, March 17.

CATTLE NOTES.

BY W. A. DE SILVA, V.S.

This little volume (published by the "Ceylon Standard" Press of over 100 leaves), meets a need experienced by many residents in the island, and being compiled for this country; it touches on the questions that constantly arise with owners of cattle. The headings of the chapters will give an idea of the scope of the work:—

Cattle and Buffaloes; Description and Aging. Cattle Food; Cattle Sheds: Handling of Cattle; Signs of Ill Health; Nursing and Attendance; Medicinal Materials; Prevention of Disease and Treatment; Milk Cows.

There is also an Index with the names of medicinal materials in Sinhalese, Tamil and Hindi.

Thirty pages are devoted to the Diseases to which Cattle are liable. The book will be found very valuable in giving simple directions as to treatment in sickness and the proper feeding and care of animals at all times, and should be in the hands of all those who own cattle. Three rupees would be well spent on the volume. As a sample of the style of the book we will quote what is said on the subject of cow-pox:—

An infective fever attended with eruptions in the teats and udder of cows. This is a very mild desease, the fever is not high, and the vesicles that appear on the udder and teats, do not give much trouble; the disease runs its course in from ten to fourteen, days. Laxatives, such as a pint of gingelly oil or linseed oil; salines as an ounce of nitre in the water, are useful in the early stages. Milk from cows suffering from this disease should not be used.

PLANTING IN BRITISH GUIANA.—According to the Government Botanist there is an excellent opening in British Guiana for small cultivators. Cacao was formerly largely produced by the Dutch, and, with due selection of situation and soil, few countries are better adapted to cacao cultivation. Rubber cultivation could also be successfully carried on, as already one or more valuable species are found in a wild state.—*Imperial Institute Journal*, March.

Correspondence.

To the Editor.

TEA PRODUCTION AND MANURE: PATANA SOIL GIVING UP TO 800 lb PER ACRE AFTER 15 YEARS WITHOUT MANURE!

DEAR SIR,—The figures given in the *Observer* (see page 697) certainly leave the impression that the production of tea has not been keeping pace with the increased area under cultivation and yet speaking from my own observation I cannot say I have noticed much falling-off in the returns of the older fields. No doubt in some instances the yield might have suffered, if the land had not been manured, but speaking *generally* of tea growing in soil which had been to some extent impoverished by crops of coffee and cinchona in older days, I find the yield, notwithstanding the age of the bushes, is being on the whole well maintained. To institute correct comparisons and arrive at accurate conclusions one must of course take the returns, not of a particular season only, but over a period of two years, from pruning to pruning and if a shortfall is experienced after *one* pruning, it may be made up for after the next. Much depends on the style of pruning, whether it is light or heavy, and still more on the plucking afterwards. The latter naturally varies according to the class of tea it is intended to produce, and labour considerations are also an important factor. Even should a particular field shew a diminished return, therefore, the chances are that it may have been the result of one of the many causes which go to influence the yield and not to the diminished vitality of the bush itself. As to any *serious* falling-off in the yield of our old tea, I cannot see it, nor do our estate returns which are accurately kept, afford ground for such a conclusion.

People speak of patna tea as giving a record yield after a few years, but I have to do with a large acreage of tea-growing in land of this description and my experience does not agree with those who take that view. As an illustration of what a comparatively poor field of patana (the soil is quartz) will do, it may interest your readers to know that in Badulla district there is a field of tea *15 years* old which has given, without the aid of manure, crops ranging from 420 lb. to 670 lb. per acre ever since it came into bearing, and *this* year the manager is expecting to beat previous records with a yield of *800 lb.* to *850 lb.* per acre all round!!

If common grass land can produce a result such as this, after fifteen years' cropping, unassisted by manure, it cuts away the ground from the feet of those who contend that cultivation is necessary to maintain the productiveness of patna soils. Still your figures go to prove that there is a falling-off *somewhere* and if it is not in the old tea, where is it? I regret to say my personal experience and observation do not provide the material for any satisfactory reply to this question. Turning to estates with which I am connected, it is only in a very few cases that a systematic falling-off in the yield can be detected and in such fields the returns were *never* good. This is important. In parts of the lowcountry I am told there is a very distinct deterioration in the condition of some of the older fields and I may observe that it is here where I have myself noticed that returns have diminished in individual fields; but there has been nothing so far as I am aware to approach a *general* falling-off in the yield, such as your figures seem to indicate and you may, I am sure, search in vain for any convincing evidence upcountry.

My fear is and always has been, not that there will be any difficulty in *growing* leaf in Ceylon, but that we may not be able to dispose of what we produce, and I think myself that all this heavy manuring which we now hear so much about is a mistake. Individuals who are first in the field may score; but the industry as a whole must suffer, and yet if we do not go ahead in keeping with the times, we shall be left behind,—so what is to be done?

If a certain gentleman who has been very successful with manuring had kept the information to himself, the prospects of the island generally would have been brighter and be none the poorer. But the ball has been set rolling now and where will it stop?

VIATOR.

[Oh, no earthly good trying to keep back information—and such a policy would be worse than useless in the end; for rumour would, as usual, magnify results greatly.—ED. *T.A.*]

BEET-ROOT SUGAR.

DEAR SIR,—Do you not think the sugar-beet would grow in Ceylon and have you any idea where seeds could be had for an experimental patch? Given sugar in the island, our guava jelly, loquat and other jams might be a profitable industry.—Yours truly,

HOUSEKEEPER.

[Has "Housekeeper" thought of asking for the wholesale price of his No. 1 and No. 2 quality sugar from the Manager of Baddegama estate, Galle?—ED. *T.A.*]

GUM OFF A TREE.

Anuradhapura, 1st March.

DEAR SIR,—I enclose a specimen of gum picked off a tree, of which I am told many are to be found in the jungles up here.

Please let me know if it indicates in your opinion that Indiarubber may prove an export from these regions when transport is available.

When this tree grows, may not better qualities be cultivated?—Yours faithfully, G.

—[The gum is the ordinary 'cashew,' not fit for rubber purposes, but if melted very useful for 'gumming,' &c.—ED. *T.A.*]

TEA ON LOOLECONDERA—ABOUT THE OLDEST IN CEYLON : INTERESTING PARTICULARS.

Loolecondera Estate, Deltota, March 23.

Dear Sir,—The *Observer* of 13th and 16th instant containing an article (page 697) and a letter (page 708) referring incidentally to Loolecondera, which you sent me I found most interesting.

With regard to the second heading of your article "Is it well to manure Tea on Virgin Soil?" I would say "Certainly not;" but the yield and quality of the leaf will depend in a great measure on careful and systematic pruning, and of course weeding; and as to burying prunings as far as my experience goes nothing is gained by burying them. I would prefer to leave such on the surface to shade the ground immediately after pruning and thus lessen the shock to the trees in being pruned and denuded of shade at the same time. The prunings being left on the surface also prevent and arrest wash and help to form new surface soil.

The old 100 acres last year gave a yield of 450 lb. made tea per acre, though 20 acres of it were pruned down. The yield would, I believe, be much larger were it not for the extraordinarily high winds which prevail here throughout the S.-W. monsoon.

As to the remark of "Old Hand," about there being no virgin soil here, besides the 100 acres referred to, which was planted with tea,—some 120 acres of forest and 75 acres scrub and patana have been planted with tea here since 1894, beside the old coffee and cinchona land.—Yours faithfully,

G. F. DEANE.

COFFEE AND TEA—AND A HIGHER CURRENCY :

EVIL TIMES APPROACHING IN INDIA?

Coonoor, Nilgiris, March 16.

Sir,—On the 28th of last month you did me the honour to publish a letter on "Labour in India and Ceylon" in which I pointed out that, from the increasing population and the corresponding increase in the cost arising from famines, the Indian Government must sooner or later be involved in financial difficulties, and that it was certain that in that case the Government would seek relief, as it did before, by forcing up the exchange in order to lessen its payments for home charges. When remarking upon my forecast you say that you "can scarcely believe this," but that it is not only possible but probable, is evident from the statement of the Indian Finance Minister when introducing the Currency Bill—June 1893, and I may remind your readers that he then said "it is not intended to do more *at present* (the italics are mine) than aim at a rate of 1s 4d," so that it is clear that the Government contemplated a higher rate than 1s 4d in the future, and that too without the pressure of any severe financial emergencies. That such emergencies must arise sooner or later is evident, when we come to consider that we have a rapidly increasing population and diminishing means of employment which must, before many years go by still further diminish, as the remaining railways and large irrigation works are completed. It is then not only possible, but in the highest degree probable, and many will be inclined to say certain, that the producers of India and Ceylon may at no distant time have to face a 1s 6d exchange, or even more, and it is to provide against such a crushing calamity that I suggest that such an amount of bounty should be granted as will us in the same position in competing with our rivals in the other silver-using countries that we enjoyed before the closing of the mints. But you think that there would not be the least hope of obtaining bounties in "the planters' interest." As to this remark I should entirely agree, were the planters interests' solely concerned, because the Government of India has hitherto not only shown an utter disregard of planters' interests; but, as I could amply prove were I not afraid of unduly encroaching on your space, taken pains to refuse them a hearing as regards those points which most conclusively show the evils arising from the currency policy. But where the interests of the cooly are concerned, when his wages are being reduced, and when even at reduced wages there are diminished numbers employed, and therefore the certainty of increased cost to the Government in time of famine, it is a different affair altogether. Unless the planters are placed on a footing of security there can be no security for the labourer. That is an argument which the Government will and must listen to. Formerly the planters stood firmly on an automatic currency which placed him on even terms with his competitors in the other silver using countries, Whereas now he is at the mercy of Government officials who have already placed a burden of 25 to 30 per cent on the back of the producers, and who, as we have seen, will in all probability increase the burden by still further forcing up the rate of exchange. What the effect of this must sooner or later be in the case of tea we can see by the effects produced in the case of coffee. We cannot, of course, prove the fact scientifically. In such matters we can only be guided by reasonable probabilities in making our deduction from the facts. We know it to be a fact that our coffee difficulties have mainly arisen from an immense over-production in South America and other silver-using countries. We also know it to be a fact that this over-production has arisen from the large breadths of coffee planted in the year of, and the year following, the passing of the Currency Act. It is therefore perfectly reasonable to conclude that just as coffee extensions would have been stimulated here, had the Governments of our rival manipulated their currencies, so as to confer on us superior exchange advantage, so has the action of the Indian Government stimulated extensions in the other silver-using countries. Now let us suppose these competing countries had been growing tea as well as coffee, is it not evident that the tea industry of Ceylon and India will be involved in all the difficulties that have overtaken coffee? But wherever coffee can be grown tea can be raised, and it is more than probable, or I may say certain, that tea will be raised in Mexico and the other countries which now compete with us as regards coffee, seeing that our Government has given them, by its currency policy,

every incentive to embark in the cultivation.

The sum of the matter in this. We must either return to our former automatic silver Currency, or India and Ceylon industries must be protected by a Bounty, or they must steadily decline in consequence of the unfair competition to which they are now subjected.

In conclusion I would warn planters that nothing can be got out of the Indian Government by a representation of planting interests. The Indian Government has declared war against those interests by its Currency policy. For the blow it has struck at us, we have only one-third of a blow to deliver in return, and that is by stopping extensions, and throwing out of cultivation, or placing in an inferior state of cultivation, all but the best lands. This will reduce not only the wages, but very largely the numbers of people employed. Such reduction in wages will gradually extend themselves to other Indian industries, so that the whole policy I advocate will hamper the Government permanently by increasing the cost of finances. Mr. Granville Acworth told the Currency Committee that the Government policy would have created a rebellion in any other country. Well we cannot rebel, but we must recognize the fact that the Government has declared war against us and that we must do our best to retaliate in whatever way will at once best serve our own interests and inflict most injury on the Government. One thing at least is certain and that is that if we do not adopt some form of strike the Government will conclude that we are so well off that we could easily afford a one-shilling-and six penny, or even a one and eight-penny rate of exchange.—Obediently yours,

ROBERT H. ELLIOT.

TEA PRUNINGS—BURIED OR UNBURIED.

March 17.

DEAR SIR,—I see in a letter from Mr. E. Ernest Green, the Government Entomologist, in the March *Tropical Agriculturist*, that he thinks it possible that root disease in the tea trees at a high district may be induced by large accumulation of *buried prunings*. What with "Old Hand"'s white ants and the chemical processes that occur in their stomachs after gorging on buried prunings and the attacks of mycelium fostered by said buried prunings, I think I will allow my prunings to lie unburied in future.—Yours truly,

DUFFER.

[A little quicklime added to the buried prunings would save trouble, as per the example of the experienced manager of "St. George," etc., Agras.—ED. *T.A.*]

TEA CROPS AND MANURING.

No. I,

SIR,—In looking through your editorial (see page 697) which discussed the subject of manuring, —it struck me that the opinions you quote as to the after effect of manuring hardly seem logical. One manures ; the vigour of bushes increases and the soil improves ; but we are told the after-effects will be a falling-off in yield. It would be just as logical to say that children should not be fed on Mellins' and other artificial foods because the child would suffer afterwards. Again a deterioration of quality is spoken of, as the result of manures. Possibly were very stimulating manures used such might be the case, but this lies entirely with the Manager ; his commonsense —coupled with the scientific knowledge we now have at our disposal should prevent such occurring. When tea is to be manured for the first time, in many cases, increased yields are undesirable and in fact excepting whenever stimulating mixtures are used, nature sees to this and devotes her time to fostering and creating the rootlets and frames so conspicuously absent, ere allowing her patients to start the work of creating excessive foliage. I have often thought that in many cases, money and time could be saved were manuring operations to be preceded by careful attention to bush and soil, treating the former to careful pruning ; bearing in mind the necessity of a healthy sound frame, free from gnarly knots, etc., and sometimes a great change for the better would occur were the roots pruned as well. As for soil, an attempt should be made to improve its mechanical condition and increase organic matter, which can be done by prunings—burying, forking and so forth, and in very steep places a small dose of some organic manure might be applied. Having done all one can in this way ; when the time came for manuring everything necessary for economical work would be at hand, instead of the manure lying idle (for want of the necessary chemical balance in soil-life in bush required to render it soluble) and being slowly washed out of the bushes' reach, a healthy growth would start at once.

My personal experience of the effects of using a mixture containing some soluble matter—sulphate of ammonia, etc.—in fields that have been in a fairly healthy condition at the time of application, is that increase of yield has commenced almost at once, accompanied by marked improvement in vigour of bushes. In one field particularly, I made repeated tests—extending from time of application—even about six months, finding the teas made from this leaf, fully equal in every particular to teas made from contemporary fields which was—though I am not quite certain on this point—hardly the case formerly. *As far* as comparing manured with unmanured property goes, figures may prove anything ; but taking into consideration *past, present and possible future* results, one argues against nature in giving a preference to unmanured estates.

As for the last item, *Over-production*, this subject is no doubt a serious one ; but more fitted for discussion by the Pessimistical Theorist than the Practical Planter ; the latter, as an individual, is hardly likely to reduce, or keep down, yield for the benefit of his neighbours.

SUPERINTENDENT.

No. II.

Peacock Hill, Pussellawa, 16th March.

With regard to your leader "Tea in Ceylon," in *Observer* of 13th instant,—

(1) Has the export (or crop) of tea from Ceylon of recent years kept up with the extension of

planted land? I think that your Directory apparently shows that it has, and that not only has it kept up but that the yield has increased per acre, as I endeavour to show. Beginning in 1883, the first year that the export, exceeded 1,000,000 lb. I find that the exports amounted to 1,665,768 lb. The acreage of tea in cultivation in same year is 32,000, from this I would deduct the acreage planted during the three previous years, as certainly not in bearing, this amounts according to Directory to 25,500 acres leaving 6,500 acres yielding 256 lb. per acre. In 1888, or five years after, the acreage planted is 183,000, deducting as before the tea planted during the previous three years which amount to 116,000 acres there remains 77,000 acres, export for the year is 3,820,723 lb. or at the rate of 309 lb. per acre. In 1893 or after another period of five years, the acreage under tea is 273,000, including 68,000 acres planted during the previous three years, deducting this the result is 205,000 acres, export 82,269,353 lb. or at the rate of 401 lb. per acre. In 1898 there are 364,000 acres of tea, deduct 75,000 acres planted during the previous three years leaving 289,000 acres, exports are 119,769,071 lb. of tea or 414 lb. per acre. Taking 1899 with (an estimated) planted acreage of 375,000, 70,000 acres was planted during the previous three years, subtracting this there remains 305,000 acres with an export, accoring to the Chamber of Commerce returns of 129,894,156, or at the rate of 425 lb per acre, or, put simply, the above comes to the following :—

Year.		Acres of Tea in bearing.		Yield per acre.
1883	..	6,500	...	256 lb.
1888	..	77,000	..	309 „
1893	..	205,000	..	401 „
1898	..	289,000	..	414 „
1899	..	305,000	...	425 „

Of course an important factor to be taken into consideration with the increase of yield, is when the bulk of the tea in the lowcountry came into bearing, this would give the yield per acre for the whole island a perceptible rise. There is no doubt as yet that the lowcountry tea has not gone back, in spite of sporadic attacks of grey blight.

(2) Is it well to manure Tea on virgin soil?—If the "virgin soil" was suitable for opening in tea, (I exclude patna and chena lands), and was properly drained when opened it should not require manure for at least fifteen years and I question if there is much tea planted in such land in Ceylon of that age. With regard to those estates you mention "formed out of virgin land doing well, and in good heart, or if shewing any slackness only of a few months duration, due to seasonal influences. Should they be manured?" One would imagine that the obvious answer to this would be no, but that there is something wrong with the tillage which could be remedied without applying manure, though it is now extensively believed, and we have good authority for it, that the systematic burying of prunings—with possibly the addition of basic slag—will do a great deal towards keeping up the yield of tea. Of course, however, if Mr. Bamber is successful in his attempt to impregnate the soil with the lower oxide of iron, in an active condition or so that it can be assimilated by the bushes, and which he shows raises the price of made tea pence per lb. according to the quantity present in the soil naturally, the answer would be "Manure by all means."

GEO. THORNTON PETT.

No. III.

Uva, March 20.

DEAR SIR,—I fully agree with you when you say you think it is a mistake to manure tea planted in virgin soil; it is I think a great error. Manuring, unless we can open new markets for our product, tends I think, to become the curse of Ceylon. The way it is being shovelled in to such fine estates as there are in the Agras, Dimbula, Bogawantalawa and on the Nuwara Eliya side appears to me to be folly. No doubt the people who are doing it do not think so. Manure old coffee estates where the tea is finely grown and is simply at a stand-still, because the soil has become exhausted. Of course another point of view must be taken besides the yield one gets in manuring. It is whether tea regularly manured is less apt to be affected by the blights it is said to be subject to. Personally from what little I have seen I am inclined to think that a well-cultivated estate is not affected so much as an unmanured one. In Haputale, however, it may be said in argument against this opinion and very rightly too, that little or no manuring has been done so far (except on Lipton's group) in this district. I think I am right in saying that so far not a single estate here has had a bad attack of blight, such as has been experienced in some parts of Dimbula and the lowcountry. I think burying prunings with lime or, better still, basic slag, where land is not too steep, an excellent practice. Then six months after, where soil requires, add a mixture to keep the tea up to an average yield of 500 to 600 lb. an acre. Further than this I would not go.—Yours,

LOOK AHEAD.

No. IV.

1883.

183,000 acres ... Yield 133 lb. per acre.
102,000 acres in bearing—crop 24,381,296 lb.
Average yield, including home consumption, say *240* lb. per acre in bearing.

1893.

273,000 acres ... Yield 309 lb. per acre.
220,000 acres in bearing—crop 84,406,064 lb.
Average yield, including home consumption, say *390* lb. per acre in bearing.

1899.

375,000 acres ... Yield 346 lb. per acre.
330,000 acres in bearing—crop 129,854,156 lb.
Average yield, including home consumption, say *395* lb. per acre in bearing.

"Given" a decent soil, etc., etc.—Quite true; but *fortunately* the island does not consist of that, or we should have a crop of 150 to 160 millions. You don't want to increase your crop if you get 500 lb., but what about the 250 lb. per acre places. To live they must manure.

Re Looleecondera,— Remember the old field quoted may give 400 or 500 lb. per acre; but look at the acreage of the whole place and crop. See Wilson, Smithett's yearly circular. I forget the acreage of this field, but I believe under 30 acres. Mr. Bamber, as you doubtless know, visited Looleeondera.

"We are leaving out of view" para.—How big a proportion of whole? You seem to be raising bogies only to knock them down

Table I. shows on your own figures crops gradually increasing on whatever figures you base it.

ERRATA.—On page 753, under heading "The Manuring of Tea," para 4, line 1, "The similarity of the increase in the field of plot five" should be "*in the yield*," &c. In the next column, "oxide of magnesia" should be "oxide of *manganese*."

Each Manager of an estate is the best judge or should be, as to whether the virgin soil estate should be manured. I take it a big proportion of estates have old coffee land and virgin soil; in my own case I am manuring the old coffee land but not the virgin soil at present.

PROPRIETOR.

No. V.

Holmwood, Agrapatna, March 22.

DEAR SIR,—In reply to your query *re* Manuring Tea on virgin soil, I can see no harm in supplying to the soil any mineral ingredient in which it might be shown by analysis to be deficient, and by adopting such a course I think the trees would be built up of stronger constitution; but manuring with the object of forcing an unnaturally large yield, I should consider a very risky proceeding, and therefore better left alone.—Yours faithfully, W. D. B.

THE MANURING OF TEA.

Colombo, Ceylon, March 23.

DEAR SIR,—Mr. Joseph Fraser sends us today the statistical results which he obtained during the second year of his experiments in manuring, and we take pleasure in annexing a copy of the same.

These statistics are drawn upon the same lines as those published in the *Ceylon Observer* on the 6th April, 1899* and will no doubt prove of great interest to the public generally. Mr. Fraser adds the following remarks:—

"The tea was four years old, and well grown when the experiments began. The field was in Guinea and Mana grass before being cleared for tea. There was no pruning in the first year, but all the plots were pruned in the second.

"The similarity of the increase in the field of plots five, six, seven, and eight in the second year is rather remarkable, though it varied to a certain extent from month to month. You will observe that the manure applied shows a maximum and minimum application of the three fertilising ingredients in the four plots. No. 6 is the most puzzling, as in all my experiments carried out previous to this, in old coffee land tea, a low percentage of nitrogen meant a low yield, and this is borne out by plot No. 3, where the nitrogen was suppressed. The only explanation that suggests itself to me is that in the plots from five to ten inclusive, there were a considerable number of 'Albizzia Stipulata' trees growing naturally in the land. A considerable number of these were cut out when the land was cleared for tea, and a fair number allowed to grow along with the tea. The decay of the roots rich in nitrogen and the fall of the leaflets yearly (the Albizzias being atmospheric nitrogen collectors) may have afforded a sufficient supply of nitrogen naturally. The decay of grass roots, would no doubt also have aided in this respect, but then all the plots had these equally. Plots one, two, and three had no Albizzias and four only one or two. The general appearance of the bushes in the various plots, as regards health, vigour and succulent growth stand in the order of six, five, seven, ten and four—eight and nine suffered most again from grey blight and the mite family of insect pests, of all the plots, and indicates that the mixture, as regards potash was not properly balanced, and this might be all the more marked as the Albizzias are strong potash feeders.

"Results from the increased profit per acre point of view, are in the order of eight, six, ten, five, seven, nine and four—No. 8 and 6 take the lead as in the previous year, but ten jumps from 7th to 3rd place. The experiments have been again repeated, and will be recorded for another two years.

"I had the soil of plot No. 6 analysed, but as is usual with soil analyses, it helps little to an interpretation of results."

We further annex copy of the analysis made by Mr. Cochran of the Pitakande soil, and his report on the same and remain.—Dear sir, yours faithfully, FREUDENBERG & CO.

(Copy)

M. Cochran,

City Analyst's Office, 56, Kollupitiya Road, Colombo, 25th November, 1899.

Analysis of a Sample of Soil from the Pitakande Group, received on the 3rd November from Mr. Joseph Fraser, per Mr. J. Morris.

MECHANICAL ANALYSIS.

The soil which passed through a sieve having 10 meshes to the lineal inch consisted of

	per cent.
Coarse Earth	46·5
Fine Earth	53·5
	100·0

CHEMICAL ANALYSIS OF THE FINE EARTH.

	per cent.
Moisture	3·650
*Organic and volatile matters ..	13·050
Soluble in standard Hydrochloric Acid.	
Oxide of Iron	12·143
Alumina and small quantity of oxide of magnesia	21·029
Lime	·168
Magnesia	·400
Potash	·233
Phosphoric Acid	·128
Silica, Insoluble Silicates and undetermined matters	49·199
	100·00
* Containing nitrogen	·156

This sample of soil is rather richer in nitrogen than the sample analyzed in January, while the latter had somewhat more potash and phosphoric acid, and was also richer in lime of magnesia.

The sample just analyzed has more alumina, and also rather more organic matter, but, nevertheless, the dried sample has less moisture than the sample analyzed in January. A drier condition of the atmosphere, when the present sample was prepared, is probably the explanation of this.

With regard to the general characteristics of the soil, it has the composition of a soil that should be fertile for tea; nitrogen, however, being relatively less than the other important constituents.

(Signed) M. COCHRAN, F.C.S.

City Analyst.

* See *Tropical Agriculturist* for May.—ED. *T.A.*

PITAKANDE GROUP.

Manure Experiments from 13th February, 1899, to 31st January, 1900.

No. of Field.		2	3	4	5	6	7	8	9	10
Particulars of Manure Applied.	No Manure.	400 lbs. Blood Meal. 200 ,, Basic Slag.	200 ,, Basic Slag. 150 ,, Sulph. of Potash.	400 ,, Blood Meal. 150 ,, Sulph. of Potash.	250 ,, Basic Slag. 400 ,, Blood Meal. 150 ,, Sulph. of Potash.	200 ,, Blood Meal. 250 ,, Basic Slag. 200 ,, Sulph. of Potash.	400 ,, W. Castor Cake. 400 ,, Fish. 100 ,, Sulph. of Ammonia. 100 ,, Nitrate of Potash.	800 ,, W. Castor Cake. 200 ,, Basic Slag.	800 ,, W. Castor Cake. 200 ,, Bone Meal.	1120 Extra Dissolved Guano.
Tea secured lbs. per acre.	781·264	931·709	894·007	960·068	1056·116	1064·499	1064·222	1067·795	1005·631	1161·220
Increased yield over unmanured plot 1899		147	110	176	272	280	280	283	221	377
,, ,, ,, ,, 1898	-	182	148	218	348	373	316	3[illegible]4	255	499
,, ,, ,, ,, for two years.		329	258	424	620	653	[illegible]96	667	476	876
Cost of Plucking and Manufacture to f.o.b 12¾ cents.			14·02	22·44	34·63	35·70	35·70	36·08	28·17	48·07
Amount realized for increased yield 3 cents.		52·92	39·60	63·36	97·92	100·80	100 80	101·88	79·56	135·72
Profit per acre over the unmanured pl 1899.		34·18	25·58	40·92	63·24	65·10	65·10	65·80	51·39	87·65
Profit per acre over the unmanured plot 1898.		*·94	3·86	6·57	19·23	32·58	12·66	38·26	10·67	6·37
Total increased profit over unmanured area for two years.		33·24	29·44	47·49	8[illegible]·47	97·68	77·76	104·06	62 06	94·02
lbs. per acre of essential ingredients in the manure applied.	Nitrogen	44·80	Nil	44·80	44·80	22·40	76·60	50·	56·	124·40
	Potash	Nil	75·	75·	75·	100·	48·	10·	10·	22·10
	Phos. Acid	34·	34·	Nil	42·50	42·50	27 16	52·	66·	56·00

*Loss.

THE GOVERNMENT DAIRY AND CATTLE SALES.

March 23.

SIR,—I see an advertisement in the papers that a sale of bulls and cows will take place at the Government Dairy on the 31st instant. This will only give an opportunity to the wealthier men to buy these fine animals, as there will be high competition. I think the Government Dairy is not in want, but in a flourishing condition, and has a balance in its favour. Taking the circumstance to be so, would it not be advisable to sell these animals in the different Koralcs and out of the way places—the sale to be open to *bonafide* villagers only—and stop the sale for the 31st instant. By this means the breed of bulls and cows in the villages will be greatly improved, and this ought to be the aim of the Government. Or why not distribute stud bulls among the villages by giving them in charge of the Headmen and Mudaliyars.

I hope Government will not lose sight of this suggestion—and a word from your pen will go a great way to help in this cause.—Yours

A CULTIVATOR.

[Well worthy of consideration.—ED. *T.A.*]

PLANTING NOTES.

THE COFFEE MARKET.—Messrs. C. J. Leech & Co. in their weekly report on the coffee market, state that there has been another week of large receipts in Rio, where the rise in exchange would seem to be having the effect of attracting the balance of the crop from the interior faster than would otherwise be the case. In the speculative centres the tone has been weak, the large Rio receipts having unfavourably affected the New York market.—*Home and Colonial Mail*, March 9.

MANURING FRUIT TREES IN HOLSTEIN.—A method of fertilising fruit trees in vogue in Holstein is suggestive, and not unworthy of a trial. The trees, it is said, receive no cultivation, and the fruit is large, sound, and produced in abundance. Every two years a few wholes are dug in the ground about four or five feet from the trunk of the tree, and about one foot deep, closer and shallower in the case of young trees. These holes are filled with liquid manure about four times during the winter months, and for young trees this is diluted with water. If there is more liquid manure than is wanted, it is distributed over the surface of the orchard, using an old street sprinkling-waggon for the purpose. There is no reason why manure water should not be used once or twice after it is seen what the crop is likely to be; of course, not affording any at that season to trees not bearing a crop, or which are carrying only a few fruits, as to dose them would be to encourage, probably, an unnecessary growth of shoots. But in this matter, the cultivator must be guided by the condition of the trees and of the soil.—*Gardeners' Chronicle.*

THE WORLD'S PRODUCTION OF PRECIOUS METALS.—The year 1899 would have been a record-breaker in the production of gold, had it not been for the conditions in South Africa, but it is estimated the production will amount to 968,000 pounds. The Witwatersrand will probably, after peace has been restored, produce 5,000,000 and the other districts in Africa 250,000 ounces, or approximately double the production of 1897. The United States, Australia and Canada also contribute an increase, so that the twentieth century will commence with a yearly production of about 1,014,000 pounds, of a value of $305,360,000, which means that the output of gold alone will exceed by $119,000,000 the average production of gold and silver combined in the years between 1866 and 1870. From the discovery of America up to the year 1899, there were produced 32,514,329 pounds of gold.—*Scientific American.*

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Castilloa Elastica Cervantes.—Orders being booked for the coming crop of seeds available in March and April, selected seed from very old trees. R. N. Lyne, Esq., Director of Agriculture, Zanzibar, writes under date 24th August, 1899:—"Please send me 200 seeds of Castilloa Elastica for further trial; the seeds of Castilloa you sent me last August germinated very well." Price and particulars in our Circular No. 32; special quotations for large orders according to quantity; immediate booking necessary to avoid disappointment.

Hybridised *Maragogipe* Coffee.—A larged-beaned superior variety of Coffee in demand; orders booked for the coming crop of seeds, February and March delivery. Price according to quantity on application.

Hevea Brasiliensis (Para Rubber).—Orders being booked for the coming crop available in August and September, 1900. This is the only crop of seeds in the year. All orders should reach us before the end of July to avoid disappointment, as we have to make arrangements in time; guaranteed to arrive in good order at destination. We have already booked a large number of orders. A Sumatra Planter writes, dating 9th March, 1899:—"I consent to the price of £——per thousand. I herewith order 50,000 upon condition that you guarantee at least 33 % seeds germinating." Plants can be forwarded all the year round in Wardian cases. Price and particulars as per our Circular No. 30. A Borneo planter writes dating, Sandakan, 17th August, 1899:—"The last lot of Para seeds turned out very well."

Ficus Elastica (Assam and Java Rubber.)—Seeds supplied by the pound with instructions; price according to quantity. This tree grows equally well in high and low land, in forest and grass land, its cultivation being extended largely by the Indian Government. For price of seeds with particulars as per our Circular No. 33.

***Manihot* Glaziovii** (Ceara or Manicoba Rubber).—Fresh seeds available all the year round; price as per our Circular No. 31. It is superior to Mangabeira rubber and second to Para rubber.

Urceola Esculenta (Burma Rubber) and **Landolphia Kirkii** (Mozambique Rubber).—Seeds and plants, both are creepers.

Cinchona *Seeds*.—Different varieties.

***Sterculia* Acuminata.**—(Kolanut). Superior quality, seeds and plants; price on application, packed to stand the transit well for several months, a hardy tree, cultivation easy.

Erythrina Lithosperma.—Thornless variety, new crops of seeds ready in December, May and June Price according to quantity on application.

Seeds and Plants of Cinnamon, Nutmeg, Clove, Sandlewood, Pepper, Cardamom, Vanilla, Arabian, Liberian and Maragogipe Coffee, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees, Shade and Timber Trees, Eucalyptus various Varieties, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products for Foreign Countries for 1899-1900 are now being forwarded to applicants in different parts of the world. Also Descriptive Price Lists of Seeds and Plants of Fruit Trees, Bulbs, Tubers and Yams, and Orchids.

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

A leading Planter writes from *New Hebrides* under date 17th January, 1899:—"I shall like a few more of your Catalogues to distribute through these Islands, as I feel sure many would place themselves in communication with you, did they know where to write for Seeds and Plants."

Our New Descriptive Price Lists of Seeds of Shade Trees for Coffee, Cacao, Tea, Cardamoms, &c., Timber Trees, Trees for Avenues, Hedges Wind and Shelter Belts, Ornamental Trees, Shrubs and Climbing Plants; and Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons and Dracinas, now being prepared and will be ready shortly.

Agents in London:—MESSRS. P. W. WOOLLEY & Co., 33, Basinghall Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Telegraphic Address:
WILLIAM, VEYANGODA, CEYLON.
Lieber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,
Tropical Seed Merchants,
HENARATGODA, CEYLON.

PLANTING IN THE WEST INDIES.

DR. MORRIS'S PLANS.

An agricultural Conference was held in Barbados in January, under the presidency of Dr. Morris, Commissioner of the Imperial Department of Agriculture for the West Indies, who described in his address the experimental work which was being done in the agricultural interests of the West Indies. In the sugar industry, for example, beside the raising of new canes and the cheapening of the manufacture, there was the reduction of the cost of cultivation to be considered, and it was expected that the present costly system of manuring might be modified without affecting the yield. The value of green manuring for fertilising cane lands was to be re-examined, and the cost of cultivation might also be reduced by increased attention to rotation and catch crops, thus growing to a larger extent than at present the food stuffs and supplies imported from other countries. Next to sugar, cacao is the most important production of the West Indies, Trinidad's export of that product showing a steady increase in value year by year. This is an industry that offers good profit to the planter; it requires little labour, compared with sugar, and is adapted for large and small cultivators. At Grenada, St. Lucia and Dominica, where many small growers have already started planting cacao, the Imperial Department will afford advice and assistance by means of travelling instructors, and establish model plots in each district as object lessons in the right methods of cultivation. A new coffee estate of about 200 acres, at an elevation of 2,500 feet, has been opened in Dominica by a Ceylon coffee planter. If this undertaking should be successful, Dominica may regain its former position as the producer of some of the finest coffee in the New World. The first-class coffee grown in the Blue mountains of Jamaica has been little affected by the recent fall in prices. Fruit cultivation continues to expand in Jamaica, and producers throughout the island must at once make arrangements to meet opportunities, which will arise, of shipping large quantities of fruit, when the new direct steamship service shall commence in January next, for it is understood that the owners of the steamers are to be purchasers of produce and not merely carriers. While bananas and oranges will be the principal products taken, there will be an increasing demand for many of the minor products which are at present luxuries in the English markets, and cultivators will do well to extend their plantations, paying the greatest attention to the quality of their produce.—*Imperial Institute Journal.*

THE DELGOLLA ESTATE CO., LD., (IN LIQUIDATION.)

The liquidation of this estate by Mr. Munton is now closed, and the result is a loss on realisation of about R135,000 out of the capital of R220,000. The shareholders have, in other words, had about R155½ paid back for each paid-up share of R400. At one time, Delgolla seemed a most promising property, having not only flourishing cacao, but also coconut palms; but the cacao proved a great disappointment after a few years, and a purchaser having been found for the estate, it seemed very wise to liquidate. Mr. John Guthrie has audited the liquidator's accounts and all is now closed.

TEA CROPS AND MANURING.

Once again we are indebted to Messrs. Freudenberg & Co. and Mr. Joseph Fraser for the results of the very careful and elaborate series of manuring experiments made by the latter on Pitakande estate. (See page 751.) This is the second year of the experiments. Planters who file our monthly ought to refer to the May number of last year for the analyses of the average of the several plots, to compare with that of No 6 plot by Mr. Cochran, given on page 753. Mr. Fraser's own remarks on the results will be specially considered; but it is evident that the observations must be continued for one or two years more, before any very definite conclusions are arrived at.

In this connection we also call attention to a couple of letters arising out of our recent article on "Manuring" and "Overproduction" —see page 751. Some of these are suggestive and useful. Two writers seem to shew that, leaving out "tea not in bearing," the average production per acre has, on the whole, increased. It seems not to be realized that we had a practical purpose in view; we insist that the acreage of tea planted on forest-land, even in high districts, is appreciable; that there are absent proprietors and shareholders who are liable to be carried away by the general cry for "manuring" and that it is worth while to shew such proprietors—getting probably not less than 500 lb. tea per acre—that they ought to leave well alone and take encouragement from the old field on Loolecondura. Very different is the case of the estates on which Mr. Fraser has been experimenting; but, on the other hand, we are bound to put his opinion on record, as now sent to us, to the effect that "generally all tea at medium and low elevations will have to be manured if yield and quality are to be kept up, even if planted in virgin soil. The forcing and exhaustive nature of the climate is so great at these elevations, both in regard to organic matter and soluble or available plant food, that the yield sooner or later invariably falls off."

Large Cedars of Lebanon.—On p. 106 of the *Gardeners' Chronicle* reference was made to these noble trees, from Transactions of English Arboricultural Society, vol., part ii. "Dimensions were given of different trees, the one growing at West Wycombe being stated to have a quarter girth of 71 inches, or nearly 24 feet at 5 feet in circumference from the ground, the largest Cedar ever seen by any arboriculturist present when the trees were inspected last August." It may interest those gentlemen, or other readers of these pages, to learn that at Goodwood may be seen, without doubt, the finest specimen in the country. It has one clean stem, the girth at 5 feet from the ground being no less than 29 feet 6 inches. At this point, however, it is where the massive limb commence to divert from the stem. The smallest measurement of the latter taken at 3 feet from the ground, exceeds 25 feet 11 inches. The height is rather more than 100 feet; spread of branches 130 feet. This specimen, together with many others, was planted in 1760. Richard Parker, Goodwood.—*Gardeners' Chronicle.*

CACAO IN SAMOA.

The following (says the Samoa *Weekly Herald*) is taken from advance sheets of a Consular report :—

Cacao is generally planted in rows about 14 feet apart and on hillsides at closer distances. Some planters favour a wider spacing ; thus it will be seen that from 180 to 225 trees are usually planted to each acre of ground occupied. During the third year a small crop is produced, but not until the fourth year is the crop of any appreciable value. Each year thereafter, as far as my short experience goes, the crops increase, and at the present time I can not even conjecture how much may ultimately be produced.

On my Papa'oloa plantation, after clearing my land of the forest growth, I set out rows of bananas in lines 15 feet apart, and when these were well under way and offering good shade, I planted my cacao with spaces of 15 feet on parts of the land and 18 feet on other portions. Along all the different roads I planted pine apples, and I also devoted several fields to them. I have reserved for pasturage about 8 acres all told, and it may seem astonishing to people outside of Samoa when I say that land has furnished abundant pasturage for six horses, fifteen sheep, and twenty one head of cattle. I can not from memory say just how much fruit I shipped last year from this place to Auckland, nor how many head of cattle I sold out of the natural increase of the place. But I am well assured that my net profits, after paying every expense, were upward of $1,200. This from 60 acres all told is very satisfactory, considering that all was obtained from catch crops (bananas and pines) planted mostly to shade my cacao, from which, during the next two years, I expect very profitable returns.

During the early months of this year, Papaloloa was raided in turn by both factions then at war, and I have up to now been unable to procure a sufficient supply of laborers to put it in its former fine condition. Though the whole of the crops was carried off or consumed on the spot during three months when hostilities existed, it is safe to say that from the sale of the fine fruit crop now coming on, I will still this year be able to score at least as good a net profit as last; though this will not cover the great loss I met with in the destruction of my herd of cattle, and the loss of 750 cacao trees wantonly pulled up by the adherents of Tanu and Tamasese.

Part of my cacao has just commenced to bear, and I am forwarding its seed pods to my different trading stations as fast as they come on. At these points they are freely given to the natives, who are now commencing the cultivation of cacao in good earnest in several districts. At Pagopago, I have at present about 3,000 trees in all stages of growth, and on my property there I have still room for about 2,000 more plants, which will be set out this year.

After Papaloloa is cleared up I expect that eight men will be sufficient for the place while we are still raising fruit for export. Next year, I will have to abandon this on account of the rapid growth of my cacao. When this is done, I will increase the number of my cattle to fifty or sixty at least, and their natural increase will probably bring me nearly as much as I should have received from the fruit and this too with less labour and trouble.—*Fiji Times*, Feb. 17.

BRITISH TROUT IN KASHMIR.

The experiments in introducing British trout into Kashmir have come to an untimely end owing to the shipping agents at home having sent the ova in a slow steamer unprovided with a cool room. Captain Allan, who went to Karachi to meet the box, found that the Duke of Bedford's gift to the Kashmir Association had developed from ova into trout long before the steamer had passed Aden. The Association has however sufficient funds at its disposal to make a further trial, and another attempt will we hear be made in the coming autumn.—*Pioneer*, March 21.

THE TEA DUTY.

SOME FIGURES.—The announcement that the Budget speech would be made on Monday was only known at the close of last week, and occasioned considerable surprise owing to the early date. A rush was made to get dutiable articles out of bond, and some of the large tea distributors have been working early and late. It is a philosophical way of looking at the matter to say that the extra duty will not affect the general consumption. Anyway, it will fall heavily on the poor, to whom tea is at once a necessary and a luxury. Although the Chancellor of the Exchequer does not appear to think so, tea contributes quite enough to the national exchequer. The additional burden of 2d per lb. is expected to produce in the course of twelve months a sum of £1,800,000. The duty from tea has produced, in the ten months ending January 31, £3,640,633 which is an increase on the corresponding ten months of last year of £344,833. The consumption per head for the period has therefore increased from 4.9 to 5.3 pounds. The receipts from coffee duty were £162,963, against £155,932 ; from cocoa £154,208, against £155,000. The decrease in the latter was caused by the increased import of raw cocoa (which is taxed at 1d per lb.) not quite compensating for the decreased import of foreign made chocolate and cocoa, which pays 2d. per lb. Brewers are not at all displeased with the Budget, for it is said they fully expected that the duty on beer would have been raised 2s. a barrel. Surprise is expressed that millionaires have been left untouched, and that coffee escapes. Certainly the Chancellor of the Exchequer believes in tea—as a source of revenue.

THE TAX ON BROKERS' CONTRACT NOTES.—Some uneasiness has been caused in commercial circles generally by the Chancellor of the Exchequer's proposal to tax contracts for goods sold by brokers. The precise wording of the resolution carried in the House of Commons on Tuesday was "that there shall be charged upon a note signed by any person carrying on the business of a broker to his principal advising him of the sale or purchase of any goods, wares, or merchandise the stamp duty following—namely : If the goods, wares, or merchandise are of the value of £5 and under the value of £100, 1d ; of the value of £100 or upwards, 1s." This proposal is of a very wide character, and, whether intentionally or not, will be pretty sure to cause considerable friction in business circles. Meetings of merchants and brokers have been held hurriedly at the London Chamber of Commerce, and a deputation was appointed to present to the Chancellor of the Exchequer a very numerously signed memorial asking for information as to the scope of the next tax, and that the memorialists might be heard before any final decision was given. The Chancellor of the Exchequer has, we believe, agreed to receive a deputation next week, and ten representative brokers and merchants have been selected for this purpose. In the House of Commons last night Mr. C. McArthur asked whether the new stamp duty on produce contracts would apply to all descriptions of produce, including sugar, cotton, corn, provisions, and iron, and whether it would be levied on both spot and future transactions, and the Chancellor of the Exchequer replied in the affirmative. He also answered a question with regard to the payments at the Custom houses on Saturday and Monday in anticipation of the extra duties to be imposed by the Budget, stating that the amount paid was £2,500,000, and that he hoped shortly to make some proposal with a view to the prevention of such large anticipatory payments.—*Home and Colonial Mail*, March 9.

APPLYING MANURE TO FRUIT-TREES.—A mistake that is very often made in the application of manure to fruit trees is in heaping it right round the trunk and forking in within a radius of a foot or two. It is not difficult to discover how far a tree's roots extend, and to distribute the fertiliser accordingly.—*Queensland Journal.*

THE RUBBER-YIELDING FICUSES IN NORTH AFRICA.

[FROM THE REVUE DES CULTURES COLONIALES NOV. 5TH, 1899.]

(*Specially translated for the "Tropical Agriculturist."*)

It would be a mistake to suppose that Algeria and Tunis had climates which would permit of a profitable cultivation of rubber-bearing plants. It would be wrong to imagine that if the northern slopes of the Atlas Mts. were unsuited, the southern and Sahara slopes would be less so. The greater part of the Algerian territory is an elevated plateau with a severe winter, and desert region, generally elevated, which refuses all cultivation save that of the date palm. More than 25 years ago attempts at growing rubber-bearing plants of all kinds in the open air were made. Repeated experiments have shown that these plants cannot stand exposure to the winter chills and that even in sheltered positions they do not yield rubber in any satisfactory quantity. . . . . The following kinds cannot stand the winter. *Bassia latifolia* and *longifolia* of India ; *Mimusops Balata* (Guiana); *Chrysophyllum diversum* ; *Hevea guyanensis* and *brasiliensis* and *Landolphia diversa* ; Nor can the various artocarpi. The *Castilloa elastica* of Mexico the *Hancornia speciosa*, of South America and the *Manihot Glaziovii* though less delicate, can only rarely stand two or three winters out of doors. On the other hand the *Sapotilla, Achras sapota* of the Antilles, succeeds well on the Algerian coast as to fructifying. but its vegetation is sluggish. The Alstonia Scholaris of the East Indies alone developes finely in the Hamma. This arborescent *Apocynea* there attains to more than 45 feet in height, but it does not yield any quantity of latex.

Various *Plumeria*, in rich soils in which water does not remain through the winter, have a fine growth, but they suffer from frost. Among the *Artocarpæ*, the genus Ficus alone offers some fine specimens among the latex-bearers, but these are strictly limited to the neighbourhood of the sea.

At the Experimental Gardens of Algiers scientists have again and again experimented on the Ficus trees growing there, many 40 years of age. Those richest in *latex* are the *macrophylla, elastica, glumacea* the latter having a great resemblance to the *macrophylla* and then the *rubiginosa*. Then among the kinds with small leaves, *Ficus lævigata, nitida*, etc.

(Then follow lists and descriptions of three groups of Ficus).

The value of the latex of the Algerian Ficus has long been questioned. Repeated experiments under various conditions showed that incision of the branch or aêrial root let flow abundant milk, especially in the summer season ; that this latex, of a pure white colour, was glutinous, coagulating rapidly, and sticking to the fingers in long filaments when they were fresh ; but, as it got older, it lost all traces of elasticity and became a dry and powdery resin.

The question had reached this point in 1890. The Ficus had grown much, and their development was attributed largely to the frequent incisions that had been made. The late Aimé Girard of the Institute, whom I still remember with affection, determined to intervene and define the flow in the quality of the rubbers obtained. Later in 1896 Aime Girard resumed the same work more methodically ; he examined all the various rubber-like latex, I could collect —which according to his directions underwent various preparations before they were sent to Paris. Death surprised this learned man in the midst of his labours, but M. Lindet has recently published a useful *resumé* of them.

I possess, however, the conclusions arrived at in private letters from M. Aimé Girard who kept me informed of his experiments.

He found the rubbers procured interesting from the anomalies they presented.

According to the different experiments of this learned man, it is at between 0·980 and 0·990, that we must place the density of ordinary rubber milk.

CEYLON TEA IN AMERICA.

That the importance of the Colombo market is likely to be steadily developed in the near future goes without saying. As an illustration of this truth we may instance the opinion of Mr. V. L. Tissera who accompanied "Mr." John Grinlinton to the Chicago Exhibition, remained in the States, started and has run the tea-importing firm of V. L. Tissera & Co. for the last eight years, and returned recently to Ceylon by the German steamer "Prinz Heinrich." He is of opinion that Americans prefer to have their tea brought to America direct from Ceylon and not *via* the home market. And Mr. Tissera's present visit to the East is mainly with the object of establishing branch firms in Colombo and perhaps, in Calcutta, by means of which he could import direct, though not yet severing his connection with the London market. Mr. Tissera's chief associates in the tea business at Chicago are the firm of Walsh, Lang & Co., who act as distributors through no less than 32 agents in the States. He finds that the American public are slowly, and by careful manipulation of the blends supplied, being brought to favour Ceylon teas, though the taste for China's is difficult to convert. Our visitor also does a certain amount of business with Ceylon coffee which is much liked by our American cousins.

Passing through Paris on his way East Mr. Tissera had the good fortune to meet our Commissioner, Mr. W E Davidson, who showed him round some of the buildings of the coming "exposition." He is reported also to have met a number of gentlemen in Paris, with whom he has arranged to run an "Oriental Booth," outside the Exhibition limits, for which unique depot he is shortly to send supplies of tea.

Mr. Tissera received some help last October from the Planters' Association representative, Mr. W. Mackenzie, in the shape of 11 half-chests of tea (black and green) in recognition of his furtherance of the interests of Ceylon tea since 1893. Our visitor is at present residing with his brother at "Tis Ville," Gregory's Road, Colombo.

GERMAN CHEMICAL INDUSTRY.—The approximate number of chemical factories in Germany is 5,950, employing 120,000 working men and 4,000 chemists. Heavy chemicals. such as soda, acids, &c, find employment for 16,000 workmen ; fine chemicals, 17,500 ; aniline colours, 14,000 ; and fatty products, 9,000. Of the chemical staffs, 220 are employed in heavy chemical work, 250 for fine inorganic chemicals, 90 for fatty products, 400 in the metallurgical industry, 300 in sugar refineries, and 1,300 in aniline dye and organic chemical works. There are about 75 to 80 works in Germany devoted to the extraction of tar products and the manufacture of aniline colours.—*Revue des Prod. Chim.*

PROPOSED NEW DOCK CHARGES IN LONDON.

A statement issued by the London Chamber of Commerce reads:—"When powers were originally given to the dock companies of London it was provided, in order to maintain the freedom of the port, that lighters and craft should have free entry into the docks to deliver or discharge ballast or goods to or from on board of vessels lying therein. At the beginning of last year, however, certain rates were imposed by the dock companies on coastwise craft engaged in this work. Under the auspices of the London Chamber of Commerce (Cement Trade Section) the action of Burham Brick, Lime and Cement Company, Limited, v. the London and India Docks Joint Committee was thereupon brought before Mr. Justice Mathew in the Queen's Bench Division, when it was decided that the new charges on sailing barges employed 'in carrying cement and other goods from the Upper Medway to be discharged into ships lying in the defendants' docks, and in receiving goods from ships lying in such docks' were 'wrongfully demanded,' and 'must be repaid.' Parliamentary powers are now being sought by the Dock Companies to impose dues of this nature, and, if obtained, it is estimated that the trade of London may be burdened with an additional contribution to the companies of over £700,000 per annum. As the dock dues, rates, and charges already levied in London are alleged to be heavier than at any other port in the kingdom or on the Continent, any further addition to the present high charges would be disastrous to the trade of London. Already notices have been issued by foreign commission houses warning their clients of the intended increase of London charges, and recommending transhipping services at Antwerp, Hamburg, or Rotterdam. A similar course was adopted during the great dock strike of 1889-90, which, as is well-known led up to the holding of stocks abroad, and the merchant when selling goods to the London market ordered lots by wire, to the detriment of London warehouse-keepers. Should the dock bills become law this course would most probably again be adopted. Amongst other public and mercantile bodies opposed to these bills as now drawn are the following:—The Corporation of the City of London, the London County Council, Association of Master Lightermen and Barge Owners, General Produce Brokers' Association, Wharfingers' Warehouse Keepers' and Granary Keepers' Association, London Flour Trade Association, Home and Foreign Produce Exchange, Limited, Wholesale Spice and Rice Dealers' Association, Indian Tea Association, Tea Buyers' Association, Ceylon Association, London Corn Trade Association, Barge Owners' Protection Society, Colonial Wool Merchants' Association, Short Sea Traders' Association, Wine and Spirit Association. Every effort is consequently being made to oppose the bills now before Parliament, or to have them referred to a Parliamentary Committee, with power to consider the whole subject of port administration."—*Home & Colonial Mail*, Mar. 9.

GUANO IN SEYCHELLES.

Writing from London on March 9th, Mr. John Hughes says:—"Probably Ceylon planters are not aware that in certain of the out-lying islands of the Seychelles there are deposits of Phosphatic Guano which from its composition is specially suitable as an ingredient of a good Tea manure. Already a few cargoes have been delivered in this country and samples have been submitted to me for analysis, so that I can testify to the quality from personal knowledge. I understand that this guano has been used for sugar-cane in Mauritius in conjunction with sulphate of ammonia, the two materials making an excellent mixture; for the guano itself contains only about 1½ per cent of ammonia and requires more nitrogen in the form of sulphate of ammonia to be added in order to render the mixture suitable for sugar-cane. It is intended to develop the working of this deposit, and no doubt the guano will be brought to the notice of Ceylon planters, as the material is in my opinion admirably adapted for tea manures for, it is not too stimulating like Peruvian and other highly nitrogenous guanos, which are quite unsuitable for tea and coffee. It would be interesting to hear whether there is any local knowledge of this Seychelles Guano, and the object of these few lines is to direct attention to the matter for further inquiry."

THE IMPERIAL BUDGET AND TEA.

WE give in our daily the full report of that portion of the budget speech and debate referring to our staple. From the point of view of the Imperial Government, it is impossible to find fault with the increase of the duty by 2d a lb. at this time, and no serious opposition, or criticism even, was offered on the proposal. The large clearances of tea in anticipation of the rise, are referred to in Messrs. Gow, Wilson & Stanton's Circular (given as a daily *Supplement*) and are also the occasion of the following pithy paragraph by Messrs. Geo. White & Co.:—

As indicating the anxiety of the Trade to forestall any advance in the tax, 5,542,241 lb. were released from Bond on the 3rd, and 17,183,638 lb. on the 5th inst., making the unprecedented total for two days of 22,725,879 lb., representing nearly £379,000 sterling.

The disorganisation of the trade following on the new arrangement, caused the postponement of the usual weekly sales.—The Rood Lane firm furnish us with some suggestive figures this time in respect of the home consumption of tea in Great Britain, showing how it has risen from 3·42 lb. per head of population in 1866 to 5·98 lb. in 1899. Ceylon tea only appears from 1885 when 3,217,000 lb. were taken off, while last year the quantity was no less than 85,137,945 lb.! China tea has fallen from 97½ millions lb. in 1866 to 23½ millions lb. in 1899; while Indian tea has risen from 4½ millions lb. to 134 millions lb. in the same period.

THE GRAPE FARM.—The following letter is from Mr. T. J. Harris, of the Jamaica Public Gardens, to the Jamaica Agricultural Society:—

"SIR,—I am desired by the Director of Public Gardens to inform you that he considers it necessary for me to again visit the grape farm at Newport, to note the progress of the vines, and to carry out any work that I might find to be necessary. He also suggests that if you thought of visiting the farm shortly, we may go together to save expense, if not I am to proceed alone."

"A Grape Farm" is what should be started at an early date in the Northern Province of Ceylon to test the country for viticulture,

RUBBER TRADE OF THE UNITED KINGDOM.

The following interesting table respecting the rubber trade of the United Kingdom for the past three years will be interesting to our readers, and although it may be misleading in some respects it is important to notice that in spite of the supposed great increase in the use of rubber, the consumption in this country was less in 1899 by nearly 5,000,000 lb. weight than in the provious year, and the value about £500,000 less. Comparing the imports there was a marked increase on the total amount imported in 1898 over 1897 of over 10,000,000 lb. of nearly £2,000,000 value, but there was a considerable falling off in 1899, the weight decreasing 4,500,000 lb., but the value was only about £300,000 less. Curiously enough the re-exports of raw rubber have steadily increased both in weight and value, but taking the average value per lb. in 1897, the imports and exports were the same, namely, 2s 0½d per lb. while that used in this country only averaged 1s 11½d per lb. In 1898, the imports averaged 2s 3¼d per lb., while the re-exports averaged 2s 4d per lb., that for home consumption amounting to 2s 4¼d per lb. During 1899, although the prices all-round were considerably higher than in 1898, the imports averaged 2s 2¼ per lb., the re-exports 2s 5¾d, while that consumed in the United Kingdom averaged 2s 0¾d per lb. Of course there are a number of points connected with a general statement such as this which detract from the value to be placed upon the result. For instance, in the imports we get a large quantity of the best quality rubber from the South American market. The average value of the Brazilian rubber imported in 1897 was 2s 10 1/8d., while for 1898 it amounted to 3s 0¾d. The figures for 1899 we have not yet complete. Of our re-exports, a large proportion is of the better quality rubber, the cheaper African kinds being largely shipped to Continental ports direct, so that our re-exports average a high rate, while our home consumption is consequently somewhat lower in comparison. We are preparing a full statement of the rubber trade for the past three years, which will doubtless prove very interesting to all engaged in the rubber trade, and we shall be glad to receive particulars from any of our readers which in any way bears upon this question :—

	Total weight	Total value	Avr. value per lb.
1897			
Raw Rubber.	lb.	£	s d
Imports	44,456,048	4,553,416	2 0½
Re-Exports	26,619,152	2,795,878	2 0½
Consumption	17,836,896	1,757,538	1 11½
1898			
	lb.	£	per lb
Imports	54 833,072	6,214,933	2 3¼
Re-Exports	33,023,536	4,020,850	2 4
Consumption	21,809,536	2 194,083	2 4¼
1899			
	lb.	£	per lb
Imports	50,360,464	5,925,643	2 2¼
Re-Exports	34,284,880	4,271,711	2 5¾
Consumption	16,075,584	1,653,932	2 0¾

--*India Rubber and Guttapercha Journal*, March 1.

SOUTHERN INDIA PRIZE TEA.

We learn that the Agri-Horticultural Society's Gold Medal for tea has been again awarded to the Glendale Tea Estates, now under the management of the Nilgiri Plantations Company, Limited. The prize tea, which is being sold at As. 8 per pound, was valued by the brokers at twelve pence. The sample case has been most kindly presented to one of the Friend-in-Need Society's Women's Workshops.—*Madras Mail*, March 28.

PLUMBAGO IN CEYLON:
THE MINING INDUSTRY AND THE COMMERCIAL "BOOM";
IS THE LATTER A BLESSING, OR CURSE, TO THE SINHALESE?
PADDY CULTIVATION DISTINCTLY FALLING OFF.

DURING a recent visit to the Southern Province, we were much struck with the evidences brought under our notice of social disorganisation, and indeed demoralisation, among the Sinhalese, in connection with the great "boom" in plumbago. The recent sudden rise in value, by fifty to a hundred per cent., had quite turned the heads of the people in districts where there is any probability of the mineral being found. Not only was agriculture neglected,—work in the paddy fields delayed or postponed until too late, attention to gardens and planting a thing of the past,—but the "craze" had affected the villagers accustomed to work for the tea planters; it had moreover greatly disturbed domestic service—so that Sinhalese house servants were at a premium,—and it has even in some quarters emptied the schools! In their haste to be rich, Sinhalese parents insist on their children working all day in cleaning and sorting the precious mineral and they call home house-boys and appus to take a part in plumbago digging or exploiting. Not only so; but we were assured that the industry with the new and greatly increased wealth which it has brought and is bringing in, is provoking an unprecedented spirit of gambling. A European resident, who knows the people and their language well in the Galle district, declared that instead of 10 and 50 cents—the accustomed stake from each in a gambling bout,—the villagers or idlers now gamble for five rupees each; and in one case, away out in the country, he had found each person staking fifty rupees! Then, again, just as gambling on horse-races in England has been brought within the reach of domestic servants, so in South Ceylon—and perhaps in other plumbago-yielding divisions—persons now wander about asking appus and ayahs, cooks and table-boys, to take a rupee, or five-rupee ticket, in a new plumbago mining company or village syndicate; and so, in all these ways, plumbago mining and preparation has provoked an extraordinary amount of gambling, with its inevitable concomitant of crime, among the people.

We were especially struck with the many paddy fields out of cultivation, no doubt a direct result of the plumbago-mining mania. But we were assured by some old residents that ever since the abolition of the paddy rent—that is eight years ago—the tendency has been to circumscribe, rather than to extend, the area under culture. This is in accordance with experience in the Central Province under the old system which permitted the purchase of the rent at a value covering a certain number of years. Where such purchase was made, it was found that the object was almost invariably to have so much less to cultivate—to secure so many more holidays—rather than to get more crops or money! Who will say that there was not

philosophy in this, although it is enough to scare a Western political economist. It is certainly time that there was a careful investigation by the several Government Agents and their Assistants as to the effect of the policy adopted from 1st January 1892, on the staple of our native agricultural enterprise in the country. It may be supposed that the plumbago diversion complicates the matter; but it should be easy to distinguish between ancestral fields neglected for the first time this year and those previously allowed to fall out of cultivation; while, of course, the reason given by the owner for non-cultivation in each case, should be specially recorded and can then be taken *quantum valeat* by the Government and the public. The practical value of such an Enquiry and Report in connection with the Administration of the rural districts and the welfare of the people, cannot be over-estimated. We actually find a London journalist of some weight, heading an extract from a local paper,—"Ceylon and a Possible Famine," basing this on the declension of paddy culture; and any day there may be questions on the subject in the House of Commons. Governor Sir West Ridgeway must see, therefore, the wisdom of being in a position, as soon as possible, to afford reliable information if called on to do so by Mr. Chamberlain. Should it appear that the wild rush into plumbago is causing the ruin of "paddy," then it may be necessary for the Government to devise some check on promiscuous "mining" (and gambling) by the Sinhalese people,—a check that may serve to choke them off from a comparatively new and precarious industry, while urging, or compelling, their attention to the one occupation to which they have been accustomed from time immemorial, and which has always been held in the highest esteem amongst them.

THE COCONUT PALM AND SCIENTIFIC CULTURE.

How delighted the late accomplished Mr. Davidson, coconut planter in the Jaffna Peninsula, would have been to have had to guide him, such a paper as Mr. Cochran furnishes today—see page 764—for the benefit of all intelligent cultivators of the palm. There is a happy combination of practical experience and scientific investigation in the results arrived at and the recommendations made; and we should like to hear what such veterans as Messrs W. B. Lamont and W. Jardine and the present experienced Managers of Franklands and Goluapokuna, have to say on the paper. before us and its several series of analyses. The great advantage obtained for the palms where the husks are allowed to be returned to the soil, is made very manifest. Manufacturers of coir fibre, etc., must necessarily compensate their gardens for the additional drain upon them. Mr. Cochran incidentally shows that the application of salt to coconut palms growing along the seaside is not required; but does that of itself not prove how much good salt should do to palms grown in the interior, away up the Mahaoya valley for instance?

PLANTING NOTES.

"AGRICULTURAL EDUCATION IN GREATER BRITAIN."—Under this heading, Professor Hedger Wallace read a paper before the Society of Arts, on February 27th. We are reproducing it in our monthly periodical, but meantime we give the paragraph referring to Ceylon:—

In Ceylon the elements of agriculture are taught as a specific subject in the Government schools, and a primer of agriculture has been published by the Director of Public Instruction. There is also a school of agriculture at Colombo which was opened in 1884, and has ten branch institutions. From this school, to which a dairy is attached, agricultural instructors are sent into remote rural districts to illustrate improved methods. The school for a number of years has also issued a monthly magazine and this, along with the *Tropical Agriculturist*, furnishes the agricultural literature of the colony, a colony, I may add, which has the reputation of being itself the best training ground for the tropical planter.

THE 1900 TEA SEASON has now fairly commenced. A number of gardens in several districts commenced taking leaf in the middle of this month and prospects are reported fair all round. Red spider is stated to have made its appearance in some Sylhet gardens after a dry spell, but a heavy fall of rain washed it away. It is too early to prophesy, but the general aspect of tea affairs is propitious for the coming season. We note from Government returns that in 1898 the area settled by time expired coolies in the Province of Assam amounted to 72,697 acres. It is explained that this does not show the whole amount of land settled with coolies, as it excludes the considerable area rented from private owners, but the figures are sufficiently suggestive, especially when contrasted with preceding years. In 1880 the acreage settled in this manner was 4,584, in 1885—8,196, in 1890—32,360, in 1897—67,923.—*Indian Gardening.*

PARA RUBBER AT THE STRAITS.—We call attention to a letter (see page 748) by our old (or rather young) friend, Mr. E V Carey, Chairman of the United Straits P.A. and at one time a Ceylon planter, like his father, Mr. Arthur Carey, before him. So important is the Para Rubber Industry in the Straits becoming, that the Chairman proposes (with apparently the countenance of Sir F Swettenham) that a special agent or expert should be sent to Brazil to report on the different modes of harvesting, preparation, &c. Now, we have no hesitation in saying that until full use is made of the information already available, such an expedition would simply mean a waste of money. In fact we question if any knowledge worth having could be added to what is already available from experts, tourists, travellers, journalists, who have ere now visited the South American rubber-yielding divisions and reported fully upon them. Has, Mr. E V Carey, for instance, digested the information in our compilation, "All About Rubber"? If he has, we should like to know what he requires from an expert visiting Para beyond what is in that volume? We are not writing egotistically; because the information referred to is not from our pen—it is taken from a hundred sources and deals with all rubber-growing countries, more especially Brazil. It would be well, therefore, for Mr. Carey's Committee to study this volume and then to draw up a series of questions as to the points on which they wanted further enlightenment at the hands of an expert visiting Brazil,

A NEW "RUBBER PLANT."—The *Semaine Horticole* of January 13th publishes an illustration and a figure of a new species of *Ficus* called *F. Eetveldiana.* It is a moderate-sized tree, growing in the Belgian Congo. The leaves are on long slender stalks, the blades cordate oblong. It will form a fine shade tree in the tropics, and grows rapidly under cultivation.—*Gardeners' Chronicle.*

"MAZAWATTE."—A Ceylon friend at home sends us a specimen of this Company's advertising, from which we quote as follows :—

£85,862 8s 8d Represents 19½ miles of 100 lb. tea chests, 5,151,746 lb. of delicious Mazawattee, equals over 2,300 tons. 1,300,000,000 cups of Mazawattee would fill a huge tea-duct 1,670 miles long by 1 ft. square. Reaching from London to Siberia, right across Europe. A river of liquid Mazawattee as long as the river Thames, 215 miles long, 8 ft. wide by 1 ft. deep.

The Sugar to sweeten this Mazawattee tea (one lump of a cubic inch to each cup) would make a road of sugar 14½ miles long, 10 ft. wide by 1 ft. thick ; and the milk for the delicious tea would fill a milk duct of 1 ft. square, which would extend from London to Dublin, a distance of 289 miles in a straight line.

THE TEA DUTY.—A London wholesale firm have through a trade journal made to their customers the following offers :—

If you remit us (PLAN A,) as a deposit, a sum equal to the present Duty of 4d. per lb. on any quantity of tea, we will hold on your account that quantity. Thus for every £25 you send, we undertake to enter for you 1,500 lb. of tea at our present list prices, and at the 4d. Duty rate, and you gain should an advance in Duty take place. If however, the Duty be not advanced, all we ask from you is to send us orders (before 31st December next) equal in amount to the sum you have actually deposited with us, and the transaction ends.

If you remit us (PLAN B,) a deposit at the rate of 1d. per lb,. *i.e.*, one-fourth the present Duty, on any quantity of tea, we will hold on your account that quantity. Thus, for every single sovereign (£1) you deposit with us, we will enter for you 240 lb. of tea at our present list prices, and at the 4d. Duty rate, and you gain if the duty be raised. You advance 1d., whilst we advance 3d., per lb. for the present Duty. If, however, the Duty be not raised, you on your part undertake to complete the purchase (before 31st December next) of all the Tea thus entered for you.

AN OLD SUBJECT REVIVED.—Few are aware probably that the question raised by "Wanderer" (see elsewhere) has been before discussed in our columns and the matter went so far at one time as that estimates of the cost of erecting a Paper Mill on the side of the Kelaniganga were prepared ; but nothing came of it and there can be no harm in now reconsidering the subject of the introduction of a paper-making industry into Ceylon. Why should the Government not take a hint and guarantee a bounty for the first ton of locally-made paper ? The value of actual local industries must be insisted upon and we are glad to find our correspondent draws further attention to this subject. Possibly people in the past have been asleep ; so our correspondent thinks : and it is within the region of the future that the fibre and grasses of Ceylon can be put to other uses than they now command. At any rate we live and learn and the man who shall introduce a paying Paper Mill into Ceylon, will deserve the cordial thanks of all of us.

DR. GEORGE WATT, C.I.E., who is retiring from the position of Reporter on Economic Products in the Department of Agriculture of the Indian Government, has been associated with this department since 1884. He will be recalled as having charge of the Imperial Indian Economic Court at the Colonial and Indian Exhibition of 1886.—*British and Colonial Druggist,* March 2.

"NATAL PLANTS."—It is highly satisfactory at this time to receive from Natal the second part of *Natal Plants.* This consists of a series of quarto lithographs, with accompanying descriptions, from Mr. Medley Wood and Mr. Maurice Evans. In the present number we find various plants of garden interest, such as Cyrtanthus Mackenni, t. 51 ; Leonotis leonurus, t. 53 ; Hæmanthus natalensis, t. 58.—*Gardeners' Chronicle.*

TEA.—According to the *Indian Daily News* the tea season in South Sylhet has begun on most of the gardens. Shamshernagar started "tipping" on the 3rd, which is early for the district. After a spell of hot dry weather, South Sylhet gardens since the 17th, have been getting a plentiful supply of rain, so that the lots of leaf may be expected. Red spider was in evidence, but the heavy rain experienced will wash a good deal of it away. Gardens, on the whole, are looking well.

APPOINTMENTS FROM KEW.—We learn that an extraordinary demand for trained gardeners for positions of importance has been experienced at Kew within the last year or so. In addition to changes of situation which have occurred in the ordinary way, nineteen appointments have been filled by the authorities. Amongst these are nursery-foremen, head gardeners, assistants in the Royal Botanic Gardens, Calcutta (N. Gill and W. F. Green) ; superintendent, Agri-Horticultural Society, Madras, (B Cavanagh) ; superintendent, Parks and Garden, Shanghai (A. Arthur) ; Curator, Botanic Station, Accra (W. Brown) ; Agricultural Instructors for the West Indies (A J Jordan and M McNiel) ; Curator, Botanic Gardens Antigua (W N Sands) ; Assistant Superintendent, Botanic Gardens, Trinidad (W Leslie). These appointments have all been filled from the improver-gardeners employed at Kew, *i.e.*, young men who after five years training in good private gardens or nurseries enter Kew for a two years' course.—*Gardeners' Chronicle.*

DESTRUCTION BY PAROQUETS.—A letter was read at a recent meeting of the Board of Management of the Jamaica Agricultural Society, from Mr. Charles H. Nunes and two others from Falmouth, Trelawny, bringing to the attention of the Board of Management, "serious loss sustained annually to the orange and lime crops by destruction thereof by parrots and paroquets, which birds were protected under the law. Not only did these birds destroy the above citrus plants, but they attacked young breadfruits. They asked the Board to bring the matter to the notice of the Government, in order that legislation might be amended in this respect, and thus yielding privilege to destroy the birds all the year round. The destruction of these birds was beyond description and they were really of no value whatever. They were sure that it opinion from different parishes be taken, if would corroborate the statement they made. The matter was referred to the Standing Committee on Fruit to report on the matter."—How about paroquets in Ceylon?

COFFEE, COCONUTS, RUBBER &c. AND PROGRESS.

(*From a Special Correspondent.*)

It is perhaps not so glowing a tale that is furnished when I turn to the world of planting and agriculture. The labour problem naturally enters largely into the former sphere and this remains still unsatisfactory. The Government has been a large employer of labour on railway and other works, and this has somewhat handicapped the planter in the way of cheap labour. In time this will right itself. The main planting industry has been coffee, but its existence in the Native States has, unfortunately, never been very flourishing, and recently the very low price of coffee, has been the means of bringing some of the best known estates to the hammer. In time those who have the financial strength will doubtless benefit, but meanwhile the weaker are being frozen out. When you see some thirteen piculs per acre as I did in the Klang district, it looks as though there should be a future. This was a lowland estate, and such a crop has not, I believe, been gathered on any of the estates on higher land. So much has been hoped for from coffee and so much capital expended, I can only hope that it will yet be a profitable industry to both individuals and the State. In other directions coconuts seem to be doing well and to be a fairly constant source of revenue, and Para rubber cultivation has made a good deal of headway and should in time make a fair show in the list of exports. I am not altogether sure, however, that the indigenous Getah Rumbong would not prove more profitable in the long run. If the price of its produce is not up to rubber, it is much more prolific in its yield, and as it is a native there is not the same difficulty about seed. Padi cultivation by natives has increased and gives signs of extension. It might well be the dream of every officer of the Government to see these Native States not only supplying their own rice requirements, but that they should be the granary of the colony of the Straits Settlements. It is well to know that land revenue is increasing, and that the cultivation of padi is being extended, but much more yet remains to be done. Unless I am mistaken, the Malay will increasingly go in for this class of work, but the progress will be less rapid than one might reasonably hope for. Some schemes for its larger cultivation have been, and are, under the consideration of the Government, and irrigation is being resorted to in more than one district.

It does not exactly come under the heading, but I may note a new industry at Ipoh that bids fair to do well. The Perak Marble Company (Limited) has been started to work on some excellent marble. It has first, good marble suitable for many domestic and ornamental uses; it is close to the line of railway, which gives the company good transport; it has good machinery, which was almost in working order at the time of my visit; and lastly, there should be a good market all around Malaya, and possibly over a more extended area. With good and economical management the company ought to do well. The material at its disposal is more than ample, and the marble is said to be of good grain.—*London and China Express*, March 9th.

TEA IN THE PHILIPPINES.

Mr. C. Ffolliott Pears, to whose adventures we have already referred fully in previous issues, having been enabled to publish a full account of them through the courtesy of Mrs. Pears, has returned from the Philippines, where he went in connection with the wreck of his vessel. He has given our evening contemporary a rough idea of what he thinks of the future of the island recently acquired by the Americans:—

TEA CULTIVATION.

"The country," said Mr. Pears, "is exceedingly fine, and I should think that some portions of it would be very suitable for tea cultivation. The soil looks as if it had plenty of iron in it. They grow coffee there already, and I did not notice any disease amongst it. Cacao is also cultivated, but the trees are sickly, and the pods very small. There is any amount of gold there, but it is not mined to any very great extent; and there is, as well, plenty of steel, from which the Filipinos make their swords. The climate of the country is exceedingly fine. In the early mornings it is nice and cool, similar to the climate of Dikoya. Of course, there is a certain amount of fever. Imported food stuffs are very dear and heavily taxed, but the industries in which there is ample room for development are sugar cultivation, saw-mills, and rice-mills. The English firms in Manila, I may say, do nearly all the business.

"The Americans," added Mr. Pears, "are just beginning to buy Ceylon tea. Dr. Stephens, a dentist who used to be in Ceylon, has imported it to Manila, and the Commissariat bought up all he had and wanted a lot more." Mr. Pears thought it would be advantageous if someone in Ceylon could secure a contract with the American Commissariat to supply Ceylon tea to the 60,000 odd troops in the Philippines.

COLOMBO COMMERCIAL CO., LD.

ANNUAL REPORT.

The following is the Report, which was to be presented to the fifth ordinary general meeting of the Company held in London, on Thursday, the 15th day of March, at noon.

The Directors have pleasure in placing before Shareholders statements shewing favourable results for the past year, viz. :—

Profit and Loss Account for the year ended 30th September, 1899.

Balance Sheet made up to 30th September, 1899.

It will be seen from the Profit and Loss Account that after debiting all charges, interest on Debentures, &c., the profit for the year amounted to..		£9,184 4 6
A balance was brought forward from last year of		1,303 8 2
Making the total at credit of Profit and Loss		£10,487 12 8
From this the following sums have been transferred, viz.:—		
To Exchange Reserve against Capital Expenditure ..	£1,400 18 5	
To Reserve Fund ..	1,000 0 0	
		2,400 18 5
Leaving available for Dividend, &c., a sum of		£8,086 14 3

CENSUS OF THE ANIMAL KINGDOM.—The editors of the *Zoological Record* have recently drawn up a table that indicates approximately the number of the living species of animals. The following are the figures given :—Mammals, 2,500 ; reptiles and batrachians, 4,400 ; tunicata, 900 ; brachiopods, 150 ; crustaceans, 20,000 ; myriapods, 3,000; echinoderms, 3,000 ; cœlenterata, 2,000 ; prtoozoans, 6,100 ; birds, 12,500 ; fishes, 12,000 ; mollusks, 50,000 ; bryozoans, 1,800 ; arachnids, 10,000; insects, 230,000 ; vermes, 6,150 ; sponges, 1,500. General total, 366,000 distinct species.—*British and Colonial Druggist.*

COCONUTS AND CHEMISTRY:

A SHORT CONTRIBUTION TO THE CHEMISTRY OF COCONUT CULTIVATION.

(By M. Cochran.)

It cannot fail to be of some service towards the perfecting of the art of manuring the coconut tree, if we compare, in respect of the more important constituents (from an agricultural point of view,) what the crop removes from the soil with what is added in manures by experienced planters.

There are several considerations which lead one to expect considerable diversity in the recommendations of experienced planters for the manuring of coconut trees, one of these is the great capability for increased yield which may legitimately be inferred from the great differences in the amounts of crop obtained from average trees grown under average conditions, and from trees grown under the most favourable conditions, thus, while the average crop all over the island is set down by some writers as between 14 and 20 nuts per tree per annum, there are trees to be found growing under very favourable conditions of soil, &c. which are said to yield for years in succession at the rate of 400 nuts per tree per annum. One writer in 1896, dating from Dombawinne estate, Mirigama, stated the maximum yield of a coconut tree as 900 nuts in one year. Another reason for the diversity in manurial recommendations is the fact that, in some cases, only the oil and part of the poonac, in others only the copra, is sent from the estate, while in other cases the whole nuts and some of the leaves are removed.

One system of manuring has for its object to return to the soil an amount of fertilising material equivalent to that removed by the copra. Taking 170 lb. of poonac as the produce of 1,000 nuts, and reckoning the poonac to contain 3·3 per cent of nitrogen, 1·35 per cent of phosphoric acid, and two per cent of potash, there would be removed in the poonac from 1,000 nuts 5·61 lb. of nitrogen, 2·295 lb of phosphoric acid, and 3·4 lb. of potash. Planters who manure expect to get at least 40 nuts per tree per annum. One planter informs me that he gets 15 nuts per picking per tree, and there are six pickings per annum, so that he gets 90 nuts per tree per annum. I shall suppose that, while some planters who manure get 40 nuts per tree, others get as many as 80. Each tree will at these rates of production remove from the soil in copra (as estimated from the poonac) in two years respectively.

	Trees yielding 40 nuts per annum. lb.	Trees yielding 80 nuts per annum. lb.
Nitrogen ..	·4488	·8376
Potash ..	·272	·5440
Phosphoric Acid ..	·1876	·3672

It is necessary, however, to take into account the fertilising ingredients removed from the soil in the husk, the shell and the "milk" of the ripe nut. From analyses I have made I find that

1,000 husks each weighing 1·789 lb.
1,000 shells each weighing ·666 ,,
500 lb. "milk" or ½ lb. per nut remove from the soil.

Nitrogen ..	..	2·6618 lb.
Potash ..	..	13·4706 ,,
Phospheric acid..	..	·6420 ,,

From these data, it is easy to calculate what is removed in two years by the husks shells and milk of 40 and 80 nuts respectively, and, adding the same to the quantities found in the poonac, we get:—

Amounts of nitrogen phosphoric acid and potash removed from the soil in two years by crops of 40 and 80 nuts per annum respectively.

Nitrogen	·6607 lb.	1·3214 lb.
Potash	1·3497 ,,	2·6984 ,,
Phosphoric acid ..	·2350 ,,	·4700 ,,

I shall now compare with these amounts of important ingredients removed by crop the amounts added to the soil by the different systems of manuring coconut trees as practised by experienced planters. First, we may consider the system of using the manure of cattle fed on the grass only of the coconut estate. This system, of course, adds nothing to the mineral ingredients of plant food of the estate; but it should increase the amount of nitrogen available for the tree, and even the mineral ingredients are rendered more available for plant food by being assimilated, first by the herbage, and afterwards by the cattle. It will be interesting, therefore, to calculate the amounts of the fertilising materials that are drawn from the soil by the grass, and converted into still more available forms of plant-food by the cattle grazing on the estate. For practical purposes, the amounts of fertilising material in the grass may be taken as the same as that supplied in the manure seeing the cattle are not being fed with a view to being fattened. I have no exact data as to the quantity of grass produced on an acre of coconut field; but I am informed by the well-known coconut planter Mr. Francis Beven, of Franklands estate, that 100 acres of coconut land can grow grass for 60 to 70 head of cattle. I also understand that he considers 50 lb. weight of grass, per head per day, as good average grazing, when there is no drought, but drought must be taken into the calculation, so I shall allow in this calculation 40 lb. of grass per head of cattle per diem. At this rate of consumption 65 cattle (the average per hundred acres) would require 2,600 lb of grass per day; and, to supply this, each acre would have to yield a little less than 4½ tons of grass per annum.

A sample of the grass on which the cattle on Franklands estate graze was analysed. In the anhydrous state it contained nitrogen 1·740 per cent. potash 2·375 per cent. and phosphoric acid ·487 per cent. If these results are calculated into fresh grass containing 75 per cent. of moisture we get:—

Fertilising ingredients in fodder grass.

		per cent.
Nitrogen ..	..	·435
Potash ..	..	·594
Phosphoric Acid	..	·122

An acre of the grass furnishing 4½ tons per annum would supply in the form of cattle manure in one year:—

Nitrogen ..	..	41·412 lb.
Potash ..	..	56·550 ,,
Phosphoric Acid	..	11·614 ,,

Taking 75 trees per acre each tree gets per annum, and during three years respectively:—

	per annum.	during 3 years
Nitrogen ..	·552 lb.	1·656 lb.
Potash ..	·754 ,,	2·262 ,,
Phosphoric Acid	·155 ,,	·464 ,,

Passing now to cattle shed manure, we find that Mr. W B Lamont recommended, as the

teaching of his experience, an application of 5 cwt. of cattle shed manure per tree once in three years. The composition of cattle shed manure varies considerably with the character of the food of the animals, of the litter, and of the management of the manure. If we reckon it as about equal in fertilising properties to the average of ordinary farm yard manure, *i.e.* as containing per ton about 8 lb. nitrogen, 9 lb. of potash, and 3·6 to 4½ lb. of phosphoric acid, then 5 cwt. per tree would furnish per tree—nitrogen 2 lb., Potash 2·25 lb., Phosphoric acid ·9 to 1·125 lb.

Another experienced planter, Mr. W Jardine, who has frequently written to the local press on the subject of coconut cultivation, has recommended the following mixture as a suitable application once in two years per tree :—

Castor Cake	..	12 lb.
Bone Dust	..	4 ,,
Wood Ashes	..	12 ,,

This mixture to be supplemented by one bushel of cattle manure when available. With materials of good quality these ingredients should furnish per tree about

Nitrogen	..	1·1 lb.
Potash	..	1 ,,
Phosphoric Acid	..	1·36 ,,

An experienced planter in the Kurunegala district informed me that, with liming the soil once in five years, the following mixture applied every two years yields 90 nuts per tree, viz, :—

Castor cake	6 lb.
Bone dust	3 ,,

This would supply at least half a pound of nitrogen per tree, about ·07 lb. potash and ·82 lb. phosphoric acid. The soil, in a case like this, must be rich in potash compounds on which the lime acts, liberating the alkali for the use of the plant; thus dispensing with the necessity of applying potash salts. Lime, by assisting in the process of nitrification, will also render available the more inert forms of nitrogen. Thus, by the addition of lime to the soil not only are applications of potash salts rendered unnecessary; but the proportion of nitrogenous manures required are also, for a time at least, reduced. Of course, it must not be lost sight of that, in adding lime to the soil, the soil is not thereby enriched with any of the three important elements of plant, food, so that the success attendant upon liming the soil will be in proportion to the natural resources of the soil.

Gathering up the foregoing results, I shall draw out in tabular form, for easy comparison, the amounts of fertilising material drawn from the soil per tree per annum by crops of 40 and of 80 nuts per tree, and also the amounts of the same materials which the different systems of manuring referred to furnish per annum per tree, togetherwith some other interesting data :—

	LB. PER ANNUM PER TREE.		
	Nitrogen.	Potash.	Phosphoric Acid.
In 40 nuts with husks ..	·330	·675	·118
In 80 nuts with husks ...	·660	1·350	·236
In 40 nuts without husks	·269	·242	·102
In 80 nuts without husks	·538	·484	·204
In copra of 40 nuts ...	·225	·136	·092
In copra of 80 nuts ...	·450	·272	·184
In food or manure of grazing cattle—about 40 lb. grass per head per diem ..	·552	·754	·155
In 5 cwt. cattle shed manure equal in quality to ordinary farm-yard manure applied once in three years	·666	·750	·3 to ·375
In castor cake 12 lb., bone dust 4 lb., wood ashes 12 lb., cattle manure one bushel applied once in two years..	·550	·50	·680
In castor cake 6 lb., bone dust 3 lb. applied once in two years to soil that has been limed	·250	·035	410
Mixtures recommended by others vary from ...	·250	·09	·115
,, to ...	·500	·56*	·500
In large nuts according to a local analysis :		sodium chloride	
In 40 nuts with husk ...		·857	
In 80 do ..		1·714	
In a year's rainfall according to Mr. Bamber's analyses for Colombo ..	·102	6·549	

On inspecting the foregoing table, it will be observed that the amounts of nitrogen the cattle manures supply, equal, or nearly equal, that required for good crops of whole nuts. It does not, however, follow that the trees require all this nitrogen to be supplied in the manure, as the amount of cattle manure required is determined more by the amount of phosphoric acid required, than by the nitrogen; phosphoric acid being the fertilising ingredient in which cattle manure is most deficient. Cattle shed manure, supposing it to be equal in quality to ordinary farm yard manure, has an advantage over the manure of grazing cattle in respect of phosphoric acid, which in five cwt. of the former, is more than is in three crops of 80 nuts per tree. The amounts of potash, in these two forms of cattle manuring are about the same, and are in excess of what is required for crops of 40 nuts, but for crops of 80 nuts a very considerable balance has to be drawn from the soil.

In the mixture of manure recommended by Mr. Jardine, the amount of nitrogen slightly exceeds that in 80 nuts without husks and with the nitrogen in the rainfall added nearly approximates to that in two crops of whole nuts of 80 per tree per annum. The mixture has nearly three times the amount of phosphoric acid that is in the crops of 80 whole nuts; but it is mostly in the slowly available form and so cannot be regarded as excessive. The amount of potash is much greater than in the copra of two crops of 80 nuts per tree. It slightly exceeds that in 80 nuts without husks; but falls short of that in 40 whole nut crops (unless the ashes used are much above the average of wood ashes in respect of content of potash) so that, for crops of 80 whole nuts, a considerable demand would be made on the potash of the soil.

In the mixture used by the Kurunegala planter, the amount of nitrogen plus that in the rainfall, falls short of the amount of copra from two crops of 80 nuts per tree; but this planter gets 90 nuts per tree, hence the balance must be obtained from nitrification of the soil—nitrogen or other bacterial action, most of the potash is supplied in this case by the soil.

According to a recent local analysis, a tree bearing 80 nuts of large size removes from the soil in crop 1·714 lb. of common salt, while Mr. Bamber's analysis of a year's rainfall for Colombo shews a supply of common salt from this source of —6·549 lb. per tree per annum. These two re-

sults seem to demonstrate that applications of common salt to coconut estates, on the sea board at least, are unnecessary. They also suggest that the rain-water near the sea may possibly supply a not inappreciable amount of potassium chloride and magnesium chloride. Sea-water, according to an analysis of the water of the Irish Channel, contains between a thirty-fifth and a thirty-sixth as much potassium chloride as sodium chloride; and if it were borne on the sea-breeze in this proportion, the rain would furnish about ·184 lb. of potassium chloride per tree per annum.

It does not follow, however, supposing potassium chloride to be present in the sea-breeze, that it is present in the same relative proportion to sodium chloride as in sea water: the proportion would probably be less, the weight of the molecule of potassium chloride being greater.

M. COCHRAN.

COFFEE—COCONUTS—RUBBER: SELANGOR PLANTERS' ASSOCIATION.

The annual general meeting was held in the Selangor Club, Kuala Lumpur, on Saturday, 24th Feb.

The CHAIRMAN informed the meeting that Mr. Carey had intimated that he was not prepared to accept office in either of the Associations for 1900, and was sure the meeting would agree with him that this was a great loss. Mr. Gibson, who had been their Honorary Secretary for a number of years, had also decided not to accept office again; but he was glad to say that Mr. Hicks had allowed his name to be put forward in the event of no other being forthcoming. He thanked all the members for their indulgence during the past year and wished the Association continued success.

Mr. TOYNBEE proposed, and Mr. SKINNER seconded—that Mr. Carey take the chair *pro tem*, which was carried unanimously.

Mr. CAREY said that, before proceeding with the next item on the agenda, which was to elect office-bearers for the new year, he should like to make a few remarks in the annual report which had been handed to them today. This, though nominally the Committee's report, was was in reality the work of the Chairman and Secretary, who were to be congratulated in handing them such a good one. He was sure they would all agree with him that it was most encouraging to note that while coffee was selling at $18 in November and $20.50 in December last, it was now quoted at $25, and confidential reports from London and elsewhere were most encouraging. They had undergone a most hard and severe struggle during the last two years and it was most creditable to find that so few had gone under, and they had every reason to be proud that the acreage under coffee had not decreased. The low prices of coffee had induced many planters in Selangor and other States to plant up large areas with Para and other rubbers and this promised to be a most profitable investment, as he had reliable information that a Para rubber tree in a neighbouring State, which was tapped twice in 10 months, half the tree at each tapping had yielded the enormous quantity of 16 lb. of rubber and the tree in no way harmed. Now the most sanguine of men could not expect such a result all over, but even supposing they got one-tenth of the above amount it would mean a fortune. Another product, which was most deserving of consideration, was the coconut, which gave in their coast districts marvellous results—he had seen a tree in the Klang district which has been in bearing for over a year is now only five years' old and has over 70 nuts on it at present, and this tree was not at all singular. Altogether, he thought they would agree with him that the planters' prospects looked considerably brighter. Mr. Darby then proposed and Mr. Rendle seconded, a vote of thanks to the retiring office bearers, which was carried unanimously. TOM GIBSON, Hon. Secy., S.P.A.

TEA DUTY.

On tea the extra duty is 2d per lb It seems clear here that the consumer will have to bear the addition. The opinion of the Mazawattee Tea Company's chairman, which company, by the way, is advertising that it has paid the record duty cheque of £85,860, is that people will take a 2s tea where they have been accustomed to pay 1s 10d for the same quality, that the cheapest tea (1s per lb.) will drop out, and that a better tea will be sold at 1s 4d. All tea issued by this company is now advanced 2d per lb. in price. Lipton's have advanced their teas by the exact amount of the duty, their 1s quality being put up to 1s 2d. Some interesting remarks were made by the Chancellor of the Exchequer on the subject of the tea tax, which are here reproduced:—

At the time of the Crimean War the duty on tea was 1s 6d in the pound. It was promptly raised by 3d with practically, I think, no objection from anybody concerned. The duty on tea in 1889 was 6d per pound, and my right hon. friend Mr. Goschen raised it by 2d. At that time the average wholesale price per pound of tea was 10.79d, making, together with the 6d duty, 16.79d per pound. Now, I am informed that the average wholesale price of tea is 8.87d per pound. If I were to add 2d to the duty that would make, together with the duty, 14.87d per pound, or 2d per pound less than the price in 1889. I propose to add 2d per pound to the duty on tea. (Ministerial cheers) That will produce £1,800,000 in the course of the 12 months.

Mr. Labouchere pointed out that the tea-drinker would now have to pay one-sixth more for his tea, while the beer-drinker would only have to pay one-thirty-sixth more, and the whisky-drinker one-fortieth more.

Traders on the whole, with the exception of the produce brokers, are hearing the new duties with equanimity. True they made an unparalleled rush to escape the increases on Saturday and Monday, on the latter day nearly £500,000 being paid in London into the Customs House, on dutiable goods. The Chancellor of the Exchequer made some allowance for this rush in his calculations on what the duty would realise, but he was afraid afterwards that he had not allowed sufficient. The payments over the normal amount in the time were estimated at £1,000,000 sterling, and probably some £250,000 remained in the pockets of disappointed merchants who besieged the Customs on Monday. Some surprise has been expressed that a duty was not placed on coffee and ærated waters, and Mr. Gibson Bowles suggested a 100 per cent tax on diamonds, furs, feathers, lace, musical instruments, and artificial flowers, but the Chancellor of the Exchequer has preferred to keep to orthodox methods.—*British and Colonial Druggist*, March 9.

CHRISTY AGENCIES.—Messrs. Thos. Christy and Co. must surely have nearly the best—if not absolutely the best—claim to be the firm with the greatest number and variety of agencies, all suited to the drug trade. This is the reason why one can never call inopportunely at 25, Lime Street for notes on novelties.—*British and Colonial Druggist*, March 2.

AGRICULTURAL COURTSHIP.

A potato went out on a mash,
And sought an onion bed;
"That's pie for me!" observed the squash,
And all the beets turned red:
"Go 'way!" the onion, weeping cried,
"Your lover I cannot be;
The pumkin be your lawful bride—
You cantelope with me."

But onward still the tuber came
And lay down at her feet;
"You cauliflower by any name,
And it will smell as wheat;
And I, too, am an early rose;
And you I have come to see;
So don't turnip your lovely nose
But spinachat with me."

"I do not carrot all to wed,
So go, sir, if you please!"
The modest onion meekly said,
"And lettuce, pray, have peas!
Go, think that you have never seen
Myself, or smelled my sigh;
Too long a maiden I have been
For favours in your rye!"

"Ah, spare a cuss!" the tuber prayed,
"My cherryshed bride you'll be:
You are the only weeping maid
That's currant now, with me!"
And as the wily tuber spoke
He caught her by surprise,
And, giving her an artichoke,
Devoured her with his eyes.

—*Exchange.*]

PLANTING AND MINES ALONG THE ZAMBESI AND THE OPHIR OF SCRIPTURE.

Dr. Carl Peters read a paper on March 7th before the *Society of Arts.* We quote as follows:—Macombe's country is situated in the Portuguese sphere of interest, but up to this time it is practically independent. He gave me the right of starting a store in his country, and I think that this is well worth having, as he is rich in gold, ivory, wax, and india-rubber, and a well-managed store is sure to pay. Altogether I think this part of Africa, from an industrial point of view, must have a future. The advantage of the navigable Zambesi leading to it cannot be valued highly enough. When the Mashonaland railway has been finished as far as Tete, you will soon perceive that as the Zambesi trade turns towards Mashonaland, the trade of Mashonaland will turn towards the Zambesi, and seek an outlet at the Indian ocean. The country of Macombe is well adapted for plantations along the Zambesi. The sugar-cane grows abundantly on the banks of the Zambesi, and I think that fine tobacco may be grown all over the country. At the western side of the country, we discovered a mountain range called Baraouro, which rises up to 4,000 feet, and is well watered. Here tea, cocoa, coffee, and other cultivations may be started, and in this part European settlers will find a healthy climate. The south of the country towards the Pungwe is again a big forest, full of game, an Eldorado for the hunter. I will not here enter on the question whether we have in the Fura district, the real spot of the ancient Ophir, as this question is only indirectly connected with the natural wealth of Macombe's counry. I personally have reasons which I will bring forward, that King Solomon's gold expeditions were directed to this part of the world. On the Zambesi Solomon's people could find all the goods, which are mentioned in the Bible as freight of the Ophir ships—gold, ivory, gum-trees, and guineafowls, as well as apes. Up to the Fura district was a continual water connection from the Red Sea. Merchants could sail up the river as far as the Lupata Gorge, and it is quite likely that they heard from the natives at the mouth of the Zambesi of the existence of this alluvial district. The likeness of the names, Fura and Afer, is perhaps not decisive, but still very remarkable. So also is the fact that Fura today has the same meaning in the Makalanga language as Ophir had in the ancient Semitic languages, "hole" or "mine." The existence of ancient Semitic ruins, as well as the survival of the old Semitic religious ideas in the population are also remarkable. What I am inclined to consider a strong evidence in favour of my Ophir theory, is the fact that when the Portuguese arrived in South Africa Arab traders told them that up the Zambesi river was the gold land of Afur, our Fura of today, and this was identical with King Solomon's Ophir. Now the Arabs were the natural decendants of the ancient Sabæan conquistadores, and a continuity of tradition from the ages of their ancestors on this point is not at all surprising. I think critical scholars will agree with me that this is, indeed, a very strong argument. The Chairman Sir Owen Burne said while public attention was entirely centred on South Africa, and the war going on there, Dr. Peters had taken them a trek up north to the Zambesi, and given them a most interesting and instructive paper. He had pointed out in a convincing manner that our modern name of Africa was practically the Latin adjective form of the ancient Semitic word "Ophir" or Afer as it was termed in South Arabia, and had shown that the links between Asia and parts of Equatorial Africa were numerous in ancient times. It seemed also to him (the Chairman) that the few specimens of the Macombe language, as given by Dr. Peters, had a certain resemblance both to Arabic and Hebrew, and this bore out a growing opinion rendered highly probable by the accurate researches of M. D'Anville and Mr. Bruce that the ancient fleets of King Solomon after passing the Straits of Bab-el-Mandeb did not sail on to Ceylon or India, as many had hitherto thought, but held their course along the south-east coast of Africa, as far as the Zambesi and the kingdom of Sofola, whence they drew their rich stores of gold and silver. It seemed to be probable also, as suggested by Dr. Peters, that from these same localities the Queen of Sheba collected those quantities of precious metals and stones which she presented in such abundance to King Solomon. [So the claim of Ceylon to include the Ophir and Tarshish of Scripture is strongly disputed.—ED *T. A.*]

RUSSIAN FRUIT.—Mr. P. Stcherbina, horticulturist, of Simpheropol, Crimea, Russia, has sent us some elaborate and beautifully prepared tables, showing the qualities of the best sorts of Cherries, Plums, Apricots, and Peaches, as observed during eighteen years. The first column contains the name of the variety, then come eleven columns showing the degree of hardihood; 2, the vigour of the tree; 3, its fertility; 4, its size; 5, its quality; 6, its firmness; 7, its market value. To each of these an allotted number of points is assigned, and these numbers are added together in a column of totals. In addition the time or season in which the fruit is available its form and colour, are given in separate columns, but these are not numerically assessed. To give one example we may say that Grosse Mignonne Peach has for the column above mentioned 8 points, 8 for vigour, 8 for fertility, 10 for size, 9 for quality, 8 for firmness, 9 for market value (not otherwise determined), forming a total of 60 points; while Early Beatrice gets only 55. Madeleine rouge has the highest number of points, viz., 73. Eighty-three kinds of Cherries are thus tabulated; forty-five Plums, and twenty-five Apricots. Some of the sorts are not known in this country, and that circumstance added to the length of the tablet makes it undesirable for us to publish them as full length.—*Gardeners' Chronicle.*

SUGAR AND WEST INDIAN AGRICULTURE

THE waking up of the West Indian sugar planters is of special interest to us as advocates of further trials locally with the sugar cane, and because it should help to keep before planters in the East—in Ceylon, India, the Straits, &c.—the importance of adopting the most advanced methods of cultivation and manufacture for each of their products. An Indian contemporary writes:—

The reports of the recent Agricultural Conference at Barbados afford some grounds for hoping that the very conservative sugar planters of the British West India Islands are at last beginning to realize that, if they are to keep their heads above water, they must abandon their old-world methods of business, and adopt the advanced scientific principles of the present day. They now recognize that the Bourbon cane, to which they have so long pinned their faith, must give way to the new seedling varieties, which yield much better results. Barbados 147 and Demerara 145, both improved canes, raised from recently-discovered seeds, yield about 3½ tons of sugar per acre, and other seedlings, are nearly as good. Dr. Morris, the Imperial Commissioner, clearly anticipates that by following the example of the European beet-growers, it will be possible, by careful selection, cross fertilization, and so on, largely to increase the saccharine yield.

So great has been the change of feeling on the part of the planters as to central factories that, instead of scouting the idea, as they did formerly, they are now petitioning to have co-operative factories started on the most approved modern systems of perfection in every detail, and if this spirit is maintained and encouraged, we may look forward to the dispersal of the gloom which has so long hung over the islands.

While every endeavour is being made to encourage the staple industry, no opportunity is lost in inducing cultivators to have a second string to their bow, and increased prosperity is expected from the extension of such minor industries as cocao, coffee, fruit, and other things. The latest introduction is indiarubber, Mr. Esme Howard being now engaged in establishing a rubber plantation in Tobago, the first of its kind in the West Indies. Dr. Morris is evidently doing his best to justify the inauguration of the Imperial Agricultural Department less than eighteen months ago.

COFFEE, TEA AND NILGIRI PLANTERS' ASSOCIATION.

The following is taken from the proceedings of a general meeting of this Association held on the 8th instant:—

LADY BIRDS.—The Honorary Secretary gave details under this heading and on his intimating that a limited supply of the Cape Lady Bird was available from Ceylon, several Members present booked the available supply.

PROPOSED TEA CESS.—Read reply from Indian Tea Association to negative the proposition passed by the U. P. A. S. I. at its 1899 meeting at Bangalore, viz., that the Secretary be instructed to write to the Indian Tea Association and press upon that body the great importance of obtaining funds for the American and Continental funds and to request it to approach the Supreme Government with the object of securing an Act, on the same lines as the Ceylon Act IV of 1894.

SEPARATE TARING OF TEA.—Proposed by Mr. Edmiston that as the subject is an important one and as tea interests are so inadequately represented at this Meeting that relative papers be circulated among tea planting members with a request that they communicate their views on the subject to the Honorary Secretary. Secondedd by Mr. Scovell and carried.

PUBLIC SALES OF TEA IN COLOMBO

DURING THE 1ST QUARTER OF 1900

	Offered	Sold	Avg.	Exchange Demand Drafts. 1900.	1899
	lb.	lb.	c.	s. d.	s. d.
Jan. 10	1,831,280	1,614 158	35	1 4 1-8	1 4 1-8
,, 17	1,364,973	1,185,022	37	1 4 5-16	1 4 1-8
,, 24	1,139,005	827 628	34	1 4 3-16	1 4 3-32
,, 31	737,556	588,927	34	1 4 3-16	1 4 3-32
Feb. 7	599,791	516,696	35	1 4 5-32	1 4 3-32
,, 14	782,790	653,888	34	1 4 5-32	1 4 1-32
,, 21	1,185,369	973,956	35	1 4 1-8	1 4 1-16
,, 28	740,953	566,329	34	1 4 3-32	1 4 1-32
Mar. 7	891,630	653,715	32	1 4 1-8	1 4
,, 14	819,759	681,953	34	1 4 3-32	1 4
,, 21	951,759	807,324	35	1 4 1-32	1 4
,, 28	902,110	744,408	35	1 4	1 4
Total for 1900—	11,946,607	9,814,004	34½	1 4 1-8	1 4 1-16
Same period 1899—	9,044,806	7,986,005	39		

PUBLIC SALES OF TEA IN LONDON

DURING THE 1ST QUARTER OF 1900.

	Packages Offered.	Packages Sold.	Reuter's Average. 1900	Gow. Wilsons and Stanton's Average. 1900.	1899.
Jan. 11	24,000	23,000	8	8	8
,, 18	31,000	29,000	7¾	7¾	8
,, 25	38,000	29,000	7½	7½	8
Feb. 1	25,000	21,000	7¼	7¼	8¼
,, 8	24,000	22,000	7½	7½	8
,, 15	25,000	23,000	7½	7½	8
,, 22	23,000	21,000	7¾	7⅝	8
Mar. 1	32,000	29,000	7⅝	7⅝	8¾
,, 8	—	—	—	—	—
,, 15	27,000	22,000	7½	7½	8¾
,, 22	28,000	26,000	7½	7⅝	8½
,, 29	26,000	25,000	7⅜	7⅜	8¾
Total for 1900	303,000	270,000	7½	7½	8¾
Same period 1899	263,000	248,000	8½		

[The figures for local sales are compiled from the weekly circular of Messrs. Forbes & Walker, while those for London sales are from the telegrams received weekly.]

GOVERNMENT SCIENTISTS FOR TEA.—Says the London correspondent of the Calcutta *Planter*, on March 2nd:—Each day that passes those engaged in practical agriculture show a greater desire to call in the aid of science to help them in their difficulties. Mr. Bamber, who for some time gave counsel to Indian Planters on the chemistry of the tea plant, has now been received with open arms by the Planters in Ceylon. This week another gentleman, Mr. J. B. Carruthers, has also left for Ceylon to give his help as mycologist, against the ravages of Fungi. Not to be left behind, the Indian Tea Association has decided to engage the services of Mr. Mann, an experienced agricultural chemist, who will in the course of this month, proceed to India to take up his duties. He is instructed by the Calcutta Committee to provide himself at the expense of the Association with all the needful requirements of a chemical laboratory. It is arranged that Mr. Mann shall visit the Ceylon tea districts *en route*.

AN OLD PROPRIETARY COLONIST:

MR. W. S. BENNETT RE-VISITING CEYLON AND THE STRAITS :—TEA, LIBERIAN COFFEE, RUBBER AND COCONUTS.

It is encouraging to see a Ceylon colonist who can date back to 1858, looking so fresh and "up to work" (in travelling and inspecting) as does Mr. W. S. Bennett, who, although retired for a good many years to a delightful Buckinghamshire home, continues to retain a proprietary and directorial tea interest in Ceylon, and has added to it an interest in Liberian coffee, coconuts and rubber in the Straits. Mr. Bennett has just returned from a visit thither. He thinks Singapore cooler than Colombo, with more frequent though very partial rains. He was much pleased with planting prospects, though coffee had suffered from ravaging attacks of caterpillars, large gangs of coolies being employed to pick them off. ("If only some hundreds of Ceylon Tamil coolies were available on each plantation," is the cry—and why not, in this year of famine in India—even extending to Madras?) Mr. Bennett is right in considering the Straits a special home for rubber, considering all the indigenous gutta and rubber-yielding trees in that region; and no less true, we told him, is it that in the Straits, we are nearer the original habitat —the great Decandolle considers it to be in Sumatra and the Eastern Archipelago —of the coconut palm than in Ceylon. So, if only abundant labour could be got, the Straits plantations should surely go on and prosper (that is, ahem, if all the Managers read and profit by the *Tropical Agriculturist!*). While travelling on the Perak river, Mr. Bennett had a sharp experience of what a thunder and rain storm can mean in the Straits, reminding him of wild monsoon bursts in his early days in Ceylon.

Mr. Bennett went upcountry to continue the inspection of estates which he began before going to the Straits. Travelling at night some weeks ago in a bullock cart between Awissawella and Ratnapura, after inspecting plumbago lands, he had an experience of what a "chill" in the tropics means, which, no doubt, he would have laughed at, when we first saw him in rude vigorous health as a young Colonist and ever-cheerful Devonian. Mr. Bennett reminded us how the Railway should really have gone up the Kotmalie valley to Pundaluoya and Dimbula with a branch to Dikoya, and that was certainly Mr. Tottenham's route when, in 1872, he offered Government to construct a 3½ feet line from Nawalapitiya to Haputale Pass, and we most cordially backed him up. There is a new private road planned near Oolapane, with a bridge across the river, which we are glad to hear Government is to give - a good bargain for the latter to get a road made by a private Company if the bridge is supplied.—We hope Mr. Bennett's short visit has proved enjoyable, and that he carried home a good report of the old Colony in which he lived and laboured so many years.

SCIENCE AND AGRICULTURE IN CEYLON:

THE ENTOMOLOGIST AND MYCOLOGIST ON CIRCUIT.

The Director of the Royal Botanic Gardens makes, through the Planters' Association, a very important announcement and one that will be welcomed by the planting community as by intelligent agriculturists all over the island. It is to the effect that he intends the new scientific officers on his staff—more especially the Entomologist and Mycologist—should make periodical tours in connection with their work throughout the country, when they can not only observe and collect subjects for investigation, but also confer with planters and others on the spot about local pests of any kind. No better mode of operations for a portion of their time could possibly be devised, and we feel sure that the various District Planting Committees will co-operate to the utmost of their power in studying the convenience, and extending all possible aid to their visitors. The first tour announced is one for Mr. E. E. Green as Entomologist to Batticaloa, the great rice and palm growing district of the East coast, where he is due on April 15th. Such a journey should be fruitful in much interesting information and finally in practical results of value to both classes of cultivators. Travelling by land, Mr. Green will pass through the Badulla and Passara districts and he proposes to visit and deal with each, as far as he may be able, either on his outward or homeward journey. Perhaps as the notice is so short this time, the latter would be preferable, in enabling the District Committees to consider the "situation" and make all needful arrangements so as to reap the full benefit of the Entomologist's visit.

COFFEE AND THE CURRENCY.

To the Editor "Madras Mail."

Sir,—Two days ago I visited, with the proprietor, an estate near this which I went over with him in 1865, and found that it looks better now than it did then. The coffee, indeed, is so flourishing that, though an old propety, I should say that it will last as long as the world chooses to drink coffee. Another estate that I went over is in an equally thriving condition. In Mysore I know on the best authority that well managed estates never looked better, or more promising for the future. And yet, with these facts which ought to attract capital to the industry, we find that advances are being refused, mortgages foreclosed, and, the surest sign of all of decadence, that wages have been reduced from the North of Mysore down to the Shevaroy Hills, and on the Nilgiris also. All of this, of course, indicates that the saleable value of estates has declined, and in the opinion of capitalists may still further decline should, as seems very probable, the wants of the Government induce it still further to force up the exchange. I need hardly add that with a decline in saleable value, and the possibility of a still further decline, the capitalist buttons up his pockets as regards loans on the security of plantations, and hastens to try and recover the money he has already sunk in mortgages.* * *

R bert H. Elliot,

Coonoor, 25th, March.

A FARMER'S EVERYDAY LIFE.

(*By "Cosmopolite."*)

The month of February is held responsible for more that is good and bad than any other month of the year, and poets of both classes—minor and major—have rhymed about the peculiarities of this distressful month, which, fortunately, is the shortest in the calendar, and, therefore, soonest brought to a close. One rhymer tells how all the other months hate a *good* February, and another sings of February filling the dyke,—be it black or be it white,—and, if the latter poet is to be depended upon, we should have a bumper harvest this year, for February has been characterised by a continual downpour of snow and rain alternately. Our roads have been blocked up, one week, by great snow-wreaths, and the next week, by flooded streams, so that I am beginning to think that, if this sort of thing goes on much longer, Nature will require to provide us with webbed feet, as only amphibious animals will be able to exist in our watter-logged island.

In such weather

THE WORK ON A FARM

during this month consists in feeding the stock in the houses, and digging those sheep that are feeding on turnips out from under the huge drifts of snow. Happy is the farmer who has a plentiful supply of turnips stored in pits near his steading, thus saving his men from the most trying work on a farm,—the digging of turnips out from under the snow, and carting them through slush, mud and heavy snowdrifts. Many sheep have been smothered, this month, in different parts of the conntry: one of my neighbours having lost 330 out of a mob of 360,—which must spell bankruptcy to him. I have been fortunate in this respect, having only lost two old ewes, who had out-lived their usefulness, and would neither breed nor fatten, owing to extreme old age.

However, as the poet says :—

"Soon, full soon, will the South wind blow,
Winter is passing, and under the snow
Violet and primrose find strength to grow."

And, as a matter of fact, now that the snow is melting, the crocuses and snow-drops are beginning to appear, in thousands, around my house, through the trees and under the hedgerows.

In the

AGRICULTURAL WORLD, FEBRUARY

is chiefly known as the month of Bull Sales and Seed Shows, the former being held at Perth, Aberdeen, and Inverness, the latter wherever two or three farmers can be gathered together. Our little Agricultural Society held its Seed Show, in spite of the distressing weather, and was remarkable on account of the indifferent judging, and the fact that the members of Committee took all the prizes. It is a truism, in rural circles, that it is better to be a friend of the judges or a member of Committee, than to own the best stock at the Show,—and this rule seems to have held good in this instance.

The Bull Sales are said to have been somewhat stiff, which is accounted for by the fact that hundreds of young bulls are sent to these sales that are not fit for stud work, and, indeed, are mere mongrels; and these sell for a trifle, which, of course, reduces the general average; but a good bull always brings a good price, and such has been the case, this year, although nothing approaching the £1,200 paid by Sir Wilfrid Lawson to the Duke of Devonshire for one, which died shortly afterwards of tuberculosis, and Sir Wilfrid suitably expressed his feelings in the following epitaph :—

"Here lies 'Duke of Oxford,' quiet and cool,
Bred by a Duke, and bought by a fool,"

During this month the Laird of our parish has crossed the mystic line dividing the world of men and things from that of shades and oblivion, at the ripe age of 81 years, and his remains were followed to the churchyard by all the countryside, as well as his own tenantry, wading through three feet of snow-drift. He was one of the most successful farming landlords in Scotland, and this was attributed to his having gained his experience in the best school in the world, namely that of Australia.

TRAVANCORE TEA SALES.

Average 7·97d. March 23rd.

Garden.	Total. Quantity.	Aver. Price.	Bro. Or. Pek. or Flowery Pekoe. Quantity.	Price.	Pekoe and Unassorted. Quantity.	Price.	Bro. Pekoe. Quantity.	Price.	Pekoe Sou. Quantity.	Price.	Broken and Souchong. Quantity.	Price.	Fannings, Dust, and Various. Quantity.	Price.
Travancore ...	1440	6·65												
Atchencoil ...	200½c	6	96½c	†6¼ †6¾	46½c	†6	—	—	35½c	5¾	14½c	5	9½c	5 5¾
Bonaccord ...	39 p	6	—	—	9	6	13	6½	7	5¾	—	—	10½c	5¼ 6
CMR ...	24	5¾	—	—	21	5¾	—	—	—	—	2	4¾	1	4¾
Home ...	80½c	6	—	—	50½c	5¾	27½c	6¼	—	—	1½c	4½	2½c	4¾
Inverauld ...	42	6¼	—	—	18	6	16	7	8	5¾	—	—	—	—
Isfield TColsfield	124 p	6¼	—	—	30	†6	88	6½	—	—	—	—	6	†4¾ 5¾
Kanan Dev Hill M	164½c	7½	29½c	8¾	28½c	7	12½c	1/0¼	55½c	6½	—	—	40½c	6 8
Merchiston ..	107 p	6¼	—	—	37	6¼	37½c	6¾	—	—	17	5¾	16½c	5¼ 6½
Penshurst ...	116	7½	32	7½	43	6¾	18	10¼	17	6¼	—	—	6	6¼
" ...	48 b	7¾	24 b	9	—	—	24 b	6¼	—	—	—	—	—	—
Sth Trav Co Ven	156	6¾	—	—	71	6¾	51	6¾ 7¾	28	6½	—	—	6	5 5½
SITCo Kuduwa K	186 p	7	51	6¾	15	6¼	75	†7¾	15	6	—	—	30 p	5¼ 6¼
" Naganalle	11	5¼	—	—	—	—	—	—	—	—	5	4¾	6	5¾
Trav TEst Co BA	143	6½	—	—	71	6¼	72	†6¼ 7	—	—	—	—	—	—

THE PANAWAL TEA COMPANY, LIMITED.

The following is from the report of the directors to be presented to the shareholders at the eighth annual ordinary general meeting, to be held on Tuesday, the 27th inst :—

The directors beg to submit the general balance sheet and profit and loss account for the year ending December 31, 1899, duly audited. The net amount at credit of profit and loss account, including balance brought forward at December 31, 1898, after providing for general expenses, directors and auditors' fees £ 3,210 6s 8d: dividends on the seven per cent cumulative preference shares were paid for 1899 in full, amounting to £371; an interim dividend of 2 per cent on the ordinary shares was paid on Sept. 15, 1899, amounting to £340, it is proposed to pay a final dividend of eight per cent on the ordinary shares for the year ending December 31, 1899, making a distribution for the year of 10 per cent free of income tax, which will absorb £1,360, to increase the reserve funds to a total of £1,000 by the addition of a sum of £508 14s 6d, to write down the estates purchased account by the sum £487 10s 5d and to write the cost of coolie advances down by £133 6s 8d leaving a balance to be carried forward to next season of £9 15s 1d. The directors recommend the distribution of a final dividend at the rate of eight per cent on the ordinary shares of the company for the year ending Dec. 31, 1899, making with the interim dividend paid to June 30, a distribution at the rate of 10 per cent for the year. No alteration has taken place during the last twelve months in the acreage of the company's properties, which stands at: tea in full bearing on December 31 last, 590 acres; jungle, on December 31st last 341½ acres. The directors consider that the shareholders have every reason to be satisfied with the result of the year's working. The crop realised for 1899 was 334,922, as against an estimate of 315,000. The yield in 1898 was 293,933. The visiting agent reported the properties as being in every way in excellent order at the date of his last inspection.—*H and C Mail,* March 16.

CACAO SUPPLY AND CONSUMPTION.

"WANTED: MORE CACAO."

Such is the heading put to a review of the cacao market by Mr. H. Hamel Smith, whose weekly reports must of late have attracted the attention of our cacao planters. We give prominence to the remarks and statistics furnished to show that the demand for cacao exceeds the supply :—

"The striking proofs which meet the eye on every side, of the steadily increasing popularity of cocoa and chocolate, either as a beverage, a highly nourishing food, or a sweetmeat, ought to encourage everyone interested in the planting of the raw article to push on and increase the area under cultivation as much as possible in order to avoid any chance of the demand exceeding the supply; for should it do so the result would be serious to producers and manufacturers alike, as it would force the price above the "margin of profit" limit, causing the makers to have to choose between losing money on their output, which they will not do, even if the scarcity was only temporary; or the very undesirable alternative of raising their list prices, which would not only check the consumption immediately, but would disorganise the trade for a very long time, as it is most difficult to get the public to agree to pay a rise in the price of an article which they have been in the habit of buying at a fixed price ever since its introduction; they do not quarrel if the price is reduced by a cutting shopkeeper, but rather than agree to a rise, the general public do without the article, and the ground gained after years of fighting our way into public favour, by means of expensive advertisements and costly machinery would be speedily lost. And yet, unless more energetic steps are taken to increase the supply than is now being done one can see by the figures given below, unmistakable signs of the demand outgrowing the supply in a few years.

"The continental manufacturers, we are told are realising the true state of affairs much quicker than their English confreres, whose one dread seems centred in the fear that the spot price may go higher than they wish. As the increase both in the deliveries and consumption has been maintained, the three years given below will be sufficient guide to go by, and so prevent the reader being bothered with unnecessary figures :

The increase in the supply is :—

	1894. lb.	1898. lb.	1899. lb.
Guayaquil	38,951,000	42,172,000	50,444,800
Trinidad	20,961,200	24,568,700	24,808,000
Ceylon	2,156,000	4,319,700	4,786,880
Grenada	9,463,200	9,062,500	8,915,200
St. Thomé (African)	12,865,700	10,564,600	30,455,040
	84,397,100	98,687,500	119,409,920

Shewing an increase in 1898 of 17 per cent, and in 1899 of 39 per cent. over 1894.

The increase in the consumption is as follows :—

	1894. lb.	1898. lb.	1899. lb.
United Kingdom	22,441,000	32,087,084	34,013,812
Germany	17,227,100	32,351,100	37,255,300
Holland	19,896,300	29,086,900	28,923,600
France	30,112,300	35,145,900	35,383,400
Spain	1,166,800	9,592,300	12,467,500
Italy	471,700	690,400	778,200
U. S. A.	15,940,500	21,095,700	35,260,000
	107,255,700	160,049,384	184,081,812

Showing an increase in 1898 of 50 per cent. and in 1899 of 64 per cent. over 1894.

Although it is true the above are neither all the producing nor consuming countries, they are by far the most important ones, and can be taken as a sound basis on which to form calculations, and to show that even if the consumption does not increase during the next five or six years, it would take all that time for the supply to come up to the same proportion of increase. But the consumption is not going to stop growing; for instance, Russia, although I believe, its consumption is increasing rapidly is almost a non-cocoa country, but when she takes to cocoa for her army as England and Germany are doing, and which Russia with its cold climate will do also before long, that alone will increase the consumption some millions of pounds; but putting the world's increase on a moderate basis, say 10 per cent per annum, during the next six years; if the present supply and demand of the whole world is two-hundred-and-fifty million pounds per annum (there is no doubt they are almost equal now, and as the seven countries mentioned account for 184 millions, and we have Russia, Austria, Portugal, Belgium, and the rest of Europe, as well as

all the cocoa producing countries which consume their own growths, I do not think another 66 million pounds too high an estimate) in six years, the supply would by adding the same increase (40 per cent) that has taken place since 1894, amount to 350 million pounds a year; whilst the consumption at a yearly increase of 10 per cent for six years, making 60 per cent in all, would amount to 400 million pounds; and as far as can be judged at present it is the consumption rather than the supply, that is the most likely to keep on steadily increasing during this period, so that about 1,907 there will be a deficit of about 50 million pounds or 280,000 bags, which would take at least 100,000 acres of land to produce.

At present, thanks to the large stocks that had been accumulating since 1895-1896, the sudden spurt in the demand has been able to satisfy itself, but this will not be the case in the future, as at present we are not only reducing the stocks, but are eating up the new crops as fast as they arrive. When Guayaquil and St. Thomé poured their bumper crops last year into the European markets, a tremendous fall in prices was prophesied, instead of which they were bought up greedily, and at the beginning of the year prices were higher than ever, and will be so again as soon as the first pressure to sell is over. If this year, and 1901 are large crop years (to humour the old fable of three fat years and one lean one) after that there is every sign of a much larger supply being needed by the manufacturers if the present demand for chocolate by the million is to be maintained. Meanwhile here are the figures comparing the present stocks for the past five years, by which it will be seen that in spite of the 21 million pounds extra, which the five producing countries mentioned gave last year over 1898, the present stock shows we have reduced the recent accumulations by 110,000 bags = another 20 million pounds, so that I am not far wrong in estimating the shortage in the next six years at about 50 million pounds unless the present rate of increase in the supply is considerably enlarged:—

	1900.	1899.	1898.	1897.	1896.
Stock—	Bags.	Bags.	Bags.	Bags.	Bags.
London	77,820	91,038	121,044	140,995	151,323
Liverpool	2,445	3,384	954	3,631	6,469
Havre	80,031	77,657	60,326	123,135	112,553
	160,296	172,079	180,324	267,761	270,345

ROYAL BOTANIC GARDENS.

With this issue of the *Tropical Agriculturist* we include in a *Supplement* the greater portion of Mr. Willis's Administration Report for 1899. There is no special novelty about it, save the first appearance of a subsidiary Report from the Entomologist; but there is a great deal of useful information under a variety of beads and signs of progress in a variety of directions. The Curator furnishes a good deal of interest respecting the Peradeniya Gardens (telling us, among other things, that the Experimental Plots now represent thirty different tropical products) just as Mr. Nock does regarding the Hakgala Gardens where, however, besides drought, such enemies as hares, moosedeer, rats and porcupine are troublesome; while a small herd of elephants put in an appearance within 50 yards of the Superintendent's bungalow in June last! The laying out of the ground near the new Picnic Arbour is one of the great improvements of the year; and the young camphor trees are reported to be growing vigorously. As usual Mr. Willis has a good deal to say on our staple products and the closing paragraph on tea is so significant that we must quote:—

> The planting community is now well acquainted with their appearance and with the ways of treating them (the tea blights.) There is thus every ground for hope that the industry will never suffer from blight in the way that coffee did, as the danger is much more likely to be recognized and taken in time by preventive measures. A "scientific" era is now beginning for this industry, and success will be to those who most intelligently apply to practice the improved methods of cultivation, manufacture, prevention of disease, &c., just as is the case with other long-established cultivation industries.

This must be reassuring; but we do not suppose that Mr. Willis quite means that had "a scientific era" been inaugurated during the early "seventies", it would have saved "coffee"? We have the fact that Dr. Thwaites, F.R.S., the then highest living authority as regards fungi, declared that he knew of no remedy for *hemileia vastatrix* in its attacks on coffee from the first day he saw it and his judgment was borne out by all after-experience under Dr. Trimen, Dr. Morris and Professor Marshall Ward. The drawing is to be allowed. Already, those engaged in the latter calling are protesting against the rule which compels them to take out a license—nominally free, but which they cannot easily obtain without sundry santosums to subordinate Goverment servants. They are not likely to be pleased with the further proposed curtailment of their rights in regard to the enjoyment of their own property, by the refusal to allow sweet toddy to be drawn at all, in areas in which trees are taxed for fermented toddy. In South Canara, Tinnevelly and Madras City, the Abkari Commissioner, while separating the two industries, has given instructions that jaggery manufacturers be allowed to commence work before their trees are marked and registered, and also be given longer hours than hitherto for plying their calling. Even these concessions have failed to satisfy Tinnevelly, where there is a great jaggery industry, and which has set on foot an agitation for the removal of all rules and restrictions which harass an untaxed trade through blackmailers. Bombay has solved the difficulty by holding all palm juice to be fermented liquor, and taxing every coconut tree that is tapped, in some places as high as R12! How would that work out for Ceylon, with its 300,000 coconut trees tapped for toddy? It would yield R3,600,000, *plus* the income from licenses for taverns for the sale of arrack! But it is the illicit trade in toddy we are dealing with now, and which we should like to see checked by a system of taxation which will leave the jaggery industry free, and that can best

be done by ensuring the free licensing of sweet toddy trees under efficient and trustworthy Inspectors, whose remuneration can easily be found from the new and necessary tax, and whose employment will be amply compensated by the suppression of the illicit trade and all the evils which follow in its train. The relative value of the two industries in Madras is shown by the fact that the annual toddy revenue of the district is over two lakhs of rupees, and the annual value of the purchases of jaggery by a single Madras firm in the district is over 15 lakhs! Absolutely no information is available in Ceylon on these points. Verily they manage these things much better in India, notwithstanding its immense area!

CEYLON TEA IN 1899 AND PROSPECTS.

A recent mail has brought us the annual report of Messrs. Geo, White & Co. on "Indian, Ceylon and Java tea." Writing of Ceylon tea, this Firm says:—"On the whole, prospects seem favourable to expansion in the sale of good liquoring descriptions, while that for very common may be partially abandoned, and the prevailing lowest retail price be 1s 4d per lb. If the purveyors to the public can induce their customers to purchase a slightly better blend than they have lately perhaps been accustomed to, they would not only benefit themselves, but also help to raise the whole Trade to a higher level than it has been on for some time."

It is interesting to note how the annual averages for the different divisions of Ceylon—as always specified in Messrs. Geo. White & Co.'s Reports—vary. Thus for,—

Udapussellawa, Nuwara Eliya, New Galway, Dimbula and Lindula, the average runs:—1897 = $9\frac{3}{8}$d; 1898 = $9\frac{1}{4}$d; 1899 = $9\frac{1}{8}$d.

Maskeliya, Dikoya and Bogawantalawa:—1897 = $8\frac{3}{8}$; 1898 = $8\frac{1}{2}$; 1899 = $8\frac{1}{2}$.

Lower Dikoya, Ambagamuwa, Kotmale, Yakdessa, aad Dolosbage, it runs:—$7\frac{1}{8}$; 7; $7\frac{3}{8}$.

Pusellawa, Ramboda, &c.—$7\frac{1}{2}$; $7\frac{3}{8}$; $7\frac{5}{8}$.

Hantane, Hewaheta, Maturata, Rangala, &c.—$7\frac{1}{2}$; $7\frac{1}{2}$; $7\frac{5}{8}$.

Kelebokka, Knuckles, Hunasgeriya.—$6\frac{7}{8}$; 7; $7\frac{3}{8}$.

Matale.—$6\frac{1}{2}$; $6\frac{5}{8}$; $7\frac{1}{8}$.

Kurunegala, &c.—$5\frac{7}{8}$; $6\frac{1}{8}$; $6\frac{7}{8}$.

Kelani Valley, &c.—$6\frac{1}{2}$; $6\frac{1}{2}$; 7.

Ratnapura, Rakwana, &c.—7; $6\frac{7}{8}$; $7\frac{3}{8}$.

Kalutara.—$6\frac{1}{2}$; $6\frac{5}{8}$; $7\frac{1}{8}$.

Udagama and Morawak Korale.—$7\frac{1}{4}$; $7\frac{1}{4}$; $7\frac{3}{8}$d.

Haputale and all Uva.—$8\frac{1}{8}$; $8\frac{1}{4}$; $8\frac{1}{8}$d.

General Average for all = 8d; $7\frac{7}{8}$d; and 8d.

MOSQUITOS AND MALARIA.

A SCHOOL OF TROPICAL MEDICINE.

In the absence of Lord Loch, Sir Henry J. Jourdain presided last night at a meeting of the Royal Colonial Institute, held at the Whitehall Rooms, Hotel Metropole, when a paper was read by Dr. Manson, medical adviser to the Colonial Office, on "A School of Tropical Medicine." Among those present were Lady Gort, Sir Cecil Clementi Smith, Sir Henry Norman, Sir William Robinson, Sir C G Walpole, Sir J Goldney, the President of the Royal College of Physicians, and Mr. J O'Halloran (Secretary).

TROPICAL DISEASES.

After some prefatory remarks on the specialisation and division of diseases, Dr. Manson proceeded to draw attention to certain forms of tropical disease, indicating their importance, showing the necessity for a special system of study to be applied to them, and pointing out how such a system could be best carried out. Dividing tropical diseases into the two classes, endemic and epidemic, Dr. Manson placed malaria first in importance under the former. It was, he maintained, the great disease of the tropics, the principal cause of sickness and death and of social stagnation. Malaria was the true reason why Africa was called the Dark Continent; and five millions died annually of fever, mainly malaria, in British India; while one-third of our soldiers in that country, European and native, suffered annually from that disease. The unhealthy, that is to say malarious, character of West Africa more than doubled the cost of government, and the death-rate there was 85·2 per 1,000. In fact, what with death and invaliding and leave of absence, two men were required to do the work of one, and to induce them to accept the employment double pay had to be offered.

PROPAGATION OF MALARIA.

The question was how could the cloud of malaria ever floating over such districts be dispelled. It was a common and misleading fallacy that disease was caused by climate: it was really caused by beasts and plants which were subject to man's dominion. The first thing was to discover the disease germ, and Dr. Manson proceeded to consider the underlying principles which govern the distribution, the propagation, the acquisition and the suppression of the malarial germ, adding that those principles would equally apply to nearly all tropical diseases. The germ of malaria lived in the human blood, it could be easily discovered there when present, and transferred by the needle of a hypodermic syringe into the veins of a healthy subject, who in a few days would develop malarial fever. This could be done in any country or climate by such artificial means, but Nature's needle and syringe was the mosquito. This was the reason why malaria was only acquired under natural conditions where and when the mosquito was to be found. The geographical distribution of malaria was therefore determined by the geographical distribution of the mosquito. Fortunately there was only a limited number of the hundred species of mosquito that propagated the malarial germ and until an insect had partaken of the blood of a germ-laden subject its bite would not be dangerous.—*Morning Herald.*

TEA DISEASES.—We have already given Mr. Collett's paper on this subject and intimated that we thought he deserved well of his brother planters for the same. We learn that while Mr. Collett does not at all presume to pose as an authority on plant diseases—although he has paid attention to the subject for a number of years—yet he thought it as well to commence thus early in the 'season' to agitate upon this question: (1) because many planters are as yet unable to identify the principal tea-diseases when they see them; and (2) because it occurred to him that an exposition of what is known of grey and brown blights, etc., up to the present time, might prevent much of the anxiety likely to follow the outbreaks of disease in July-August, which, he fears, are inevitable.

THE COCONUT PALM AND FERTILIZERS.

Following on Mr. Cochran's valuable exposition of the chemistry of the coconut, (see page 764) we have the needful commentary and illustrations on the said scientific paper, which only a practical planter can supply. "W.J." is well-known as an authority on the culture of the palm, second to none in the length and variety of his experience. On the whole, he is not only cordially appreciative of the value of the analyses supplied by Mr. Cochran; but his recommendations are to a great extent in correspondence, though he shows good reasons for pursuing an original course in the application of his fertilizers. This plan of application is just what an experienced planter might be expected to devise after, probably, a long course of experimental cultivation. We commend Mr. Jardine's counsel to the careful consideration of young coconut planters, of whom there are a good many now-a-days in different parts of the island. It has long ago been accepted as an axiom that no plant is so greedy of manure, or so responsive in profitable crops, as the coconut palm. One old veteran cultivator has been accustomed to say that for every rupee sunk in manure in a coconut garden, a return of from five to ten rupees may fairly be anticipated; while in our Manual, figures will be found recorded, showing how a proprietor raised the nett annual return from his garden to R130 an acre through judicious manuring. But here comes in the heresy of our friend "W. J.": he doubts the value of applying salt to the coconut palm!—and bases his argument on the fact that trees 50 or 60 miles inland yield as good crops as do palms by the seashore, where, of course, salt is more freely available in the soil and atmosphere. All we can say is that if trees in the interior do so well, they ought to do even better, after a judicious application of salt! But, of course, "W. J." is speaking from ordinary observation and not as the result of a definite experiment, taking gardens of about the same age, soil and planting—the one near the sea and the other say in Kurunegala district? Of course, if the rainfall in the interior is as rich in "salt" as Mr. Kelway-Bamber shows the Colombo rainfall to be, there is no more to be said. But it should be remembered that "common salt" (sodium chloride) is most useful in other respects besides that of being a direct fertilizer. It increases, for instance, the power of certain soils to absorb moisture from the atmosphere. What could be a more useful property than this in some parts of the interior? Scientifically, the fertilizing properties of salt when applied to land are thus given:—

1st.—It promotes decomposition of animal and vegetable substances in all cultivated soils.

2nd.—It destroys vermin, kills weeds, &c., which are thus coverted into manure.

3rd.—It is a direct constituent or food of some plants.

4th.—It acts on vegetable substances as a stimulant.—Dr. Priestly proved this by various interesting experiments shewing that while an overdose of salt killed plants, a limited application in water kept them alive longer than those treated with water alone. A solution of chlorine in water will make certain seeds vegetate whi would otherwise rot in the earth.

5th.—Salt preserves vegetables from injury by sudden transitions in the temperature of the atmosphere.

6th (and most important).—Salt renders earth more capable of absorbing the moisture of the atmosphere, a property of the first importance, since those soils which absorb the greatest proportion of moisture, are always the most valuable to the cultivator. "It affords" (said Davy, Agric. Chem. p. 184) "one method of judging of the productiveness of land." The absorbent powers of common salt applied to land, are shewn by a table of experiments to be greater than those of six other well known manures.

And now we come to "W. J."'s closing challenge as to any coconut estate in the island in good cultivation yielding crop at the rate of 90 nuts per tree per annum over any considerable extent? We are not prepared to point to any such plantation; but after all that has been said of the wonderful effect of manure on the palm, it is very strange that there are no such model plantations available. Here, for instance, is what Mr. W. B. Lamont wrote on this part of the subject in December 1897:—

WHAT MAY BE EXPECTED OF PROPER TREATMENT.—The whole system consists of the regular tillage of the soil, and the periodical application of a fixed amount of suitable manure. There is no increase of crop in the first year of applying manure; but there is a considerable increase in the second, and a still greater one in the third; but in the fourth there will be a falling-off from the crop of the third year. To renew the operation of digging and manuring every second year, will therefore not only maintain the highest yield reached, but increase it year by year without any practical limit. It is well-known that individual coconut trees of good jat, that have happened to grow on a spot of naturally rich soil, habitually yield from 300 to 400 nuts per annum without any cultivation. It is then an extravagant idea that a field yielding from two to three thousand nuts per acre, with little or no cultivation, may with scientific treatment be made to yield double those numbers in a few years.

Surely it is time some practical man in our midst, with a young garden, gave a thorough test to the statement that there is no limit (in reason) to the crop of coconuts, which judicious cultivation and liberal manuring may be expected to produce.

..BBER ESTATES OF PARA, LIMITED.

WHY CRUDE RUBBER REMAINS HIGH.

The reports submitted at the second ordinary general meeting of the Rubber Estates of Para, Ltd., held in London on December 22, were far from satisfactory to the shareholders. They contain some points however, which may be of general interest as helping to show why Para rubber is high in price. The company employ rubber collectors, each of whom works two *estradas* (roads) of about 100 trees each. The company charge each collector a yearly rental per *estrada* of 25 kilograms (equal to 55 pounds) of rubber, regarded as equivalent at this time to £7 6s. The remaining rubber collected is bought by the company at a price which on the average is 7d per pound below the price in the Para market. There are thus two sources of income to the company against which they must pay the expenses of sending the collectors from their homes to the rubber fields and supplying them with working equipment. There is a further source of profit to the company in selling to the collectors all the food and other supplies needed by them and their families, for which purpose stores are maintained on the estates. But the company are far from realizing as net profit, the total selling

value of the rubber which they have to dispose of in the Para market. The expenses at Para have been large, and the cost of management at the London end has also been so heavy that retrenchment in the latter respect has already been agreed upon.

The statement made to the shareholders in April last as to the number of collectors at work was by no means fulfilled. It was based upon estimates made by the manager on the estate, who said at that time there were at least 650 men working, but that figure was subsequently reduced to 450, afterwards to 328 and finally to 290. Then it was estimated that it would require £12,000 to equip these 650 workers, whereas £23,000 was actually spent in equipping the smaller number. This sum is partially offset by the stores on hand at the end of the season ending June 30. The report was adopted, subject to an investigation by a committee of shareholders.

The estate referred to, on the island of Marajo, consisting of 284 square miles, was purchased in 1898 from the Visconde Sao Domingos who was reported to have derived from it as much as 250 tons of rubber per year. On account of delays in making the transfer, the company were unable to collect any rubber during the first crop season. During the second season the company received 58 tons (equal to 255,390 pounds) as a result of using up £23,000 of their working capital. Naturally there have been no dividends on the company's £350,000 in shares.

The *India Rubber World* has obtained some points from Mr. Henry A Cowles who for some time past has been in charge of a rubber estate in Peru, owned by New York capitalists. The company pay for rubber collected on their own lands about 35 *sols* per *arroba* of 33 pounds, or in the neighborhood of 50 cents per pound. The rubber is sold in the Iquitos market at a certain advance, after which it passes, as a rule through several hands before reaching the manufacturer. There is no such thing as paying wages to the collectors; they keep closely informed as to the prices ruling in Iquitos, and with every advance in the market they demand a higher price. On account of the great scarcity of laborers throughout the Amazonian rubber districts, they are able practically to make their own terms. The company make a certain profit on the supplies furnished to the collectors, but the prices which can be charged is limited by prices in the Iquitos market, with which the rubber workers also keep well acquainted. The laborers are always in debt to the company, and the death or desertion of one of their number means a clear loss to the company. In answer to a question as who has profited by the rise in rubber which has been steady since the middle of 1895, Mr. Cowles says that the greater part of the advance has gone to the rubber collectors. Moreover, there is no hope of a lower scale of payment for their work for the reason that, having become accustomed to high wages, it will be difficult in future to get the men to go into the forest for less money. Good profits have also been made by the traders who explore every part of the rubber country, buying rubber in small lots for all kinds of goods, and selling the rubber collected to the exporting houses along the Amazon. Mr. Cowles is of the opinion, however, that manufacturers might profit by buying rubber nearer the sources of supply than is now the rule. He mentioned the case of one New York manufacturer who, within a year, has arranged for the purchase of rubber for direct shipment from Manaos, with very satisfactory results. He is convinced that the greater part of the Amazonian rubber resources have not yet been touched, but as new districts are gone into the labor supply becomes worse rather than better, with the result of pointing to higher costs of collection.—*India Rubber World*, March 1.

A FARMER'S EVERYDAY LIFE.
No. III.
(*By Cosmopolite.*)

March came not in like the proverbial lion, but like Mary's little pet lamb, and it has continued to provide us with quiet, mild and summer-like days, which materially help farmers to overtake the work that fell into arrears during the snowstorm of February. The ploughs are rapidly turning over the soil and the appearance of March dust—a peck of which is said to be worth a king's ransom—gives indication of an early sowing season.

The microbe of influenza has taken its departure from our midst, and the late sufferers from this dire disease have begun to prance around on their bicycles, thereby laying the seeds of *Kyphosis bicyclistarium*, which is, I understand, the scientific term of bicycle rider's stoop. In a late number of the *Tropical Agriculturist*, I read an article to the effect that Eucalyptus Globulus is a preventative against influenza, but, although I have a healthy plant of some 8 feet in height, in my own special study, it yet failed to keep me in a state of immunity from the plague; indeed, on the contrary, I think, I had a more severe attack this year than ever I had before, and so another of our cherished beliefs in the beneficial influence of the Blue Gum is thus ruthlessly destroyed.

It is not every couple who can expect to live to see the

SPIRITS AND BEER

has been announced by the Chancellor of the Exchequer, in his budget speech, has filled with consternation, the drinking men of our Parish—and I regret to say their name is legion. Strong efforts have been made during the past two years to convert the "drunks" of our village to the paths of sobriety, but with very indifferent results. Let us hope that the extra duty on spirits may prove more successful. I was told that one of the most capable drinkers of our community had declared his intention of giving up the habit rather than pay the extra duty, and this augurs well, for he was about the last man that I would have expected it of. He speaks with a Scotch accent, so broad that one could cut it with a spade, and drinks whisky and water strong enough to float a marlinespike; but when I asked a neighbour if it was true that this dissipated member of society had given up spirits entirely, he replied :—" Well, I would not exactly say that, although it is quite true that he does not drink whisky since he took the pledge : he only soaks his bread in it." After that I am inclined to think his conversion to teetotalism will take place—as the bumper coffee crop of Ceylon was always expected—next year—" naleki "!

I am surprised to find that so many of my neighbours are shareholders in wildcat

AFRICAN MINING SCHEMES.

Hardly a day passes without my getting prospectuses of companies to be floated in Westralia, Africa, South America or some other outlandish place ; but these prospectuses quickly find their way to the back of the fire. My astonishment therefore was great when I learned that the reason why so many residents in this parish are taking a lively interest in the war in Africa is because of the shares they own in the mines of Johannesburg, etc. Faith, after all, is the lever that moves the world. The German-Jewish miner of Africa in his lonely hut knows this full well, and so he digs a hole and sends up specimens, and then, like

the sterling fellow he is, he lets the public into the good thing—"there's millions in it"—and the shares are snapped up by all and sundry, even to the farmers of this remote corner of Scotland and scrip is in every man's packet. Then comes the calls, even to the hundred and tenth, and the shareholders file up to the bankruptcy court, and there is an end of it. Ah! how many promising affairs such as these have turned out like the baseless fabric of a dream and left but the scrip behind. In this age the terrible desire to get on has become general. Poverty is dreaded, riches are worshipped, so that farmers even have taken to dabbling in shares and other speculative transactions, because they know too well that fortunes are rarely made at their own legitimate profession. I do not know that large fortunes have ever been made in farming; if they have, the process must have been slow and gradual. Unfortunately, it only happens about once in seven years that a good season is accompanied by good prices for farming produce, but that year gives the farmer a good lift to tide over the two or three middling years and, at least, one pretty bad one which generally follows, so that the utmost benefit a farmer derives from a fat year is that he can hold his own against the lean years which follow. But the pleasure of a farmer's life weighs against these untoward circumstances, and it is comforting to know that money made by legitimate farming, must be made honestly and no one is deceived or loses by his neighbour's success: whereas in commercial dealings, one man's gain is another man's loss. There is an old saying:—"Shoemaker, stick to your last," and I would recommend my brother farmers to stick to the slow process of accumulating wealth by farming, and not attempt to gain a rapid fortune by dabbling in shares. I know the game well, and saw plenty of it in Australia; so the prospectuses which I receive daily, by the post, go to the back of the grate in my house.

CEYLON TEA PLANTATION COMPANIES:

WONDERFUL RESULTS FROM LIBERAL CULTIVATION IN THE BASE OF THE PITAKANDE COMPANY.

Elsewhere we give the Reports of three local Plantation Companies; but two of them, we may briefly dismiss, remarking that we trust there are better days very near at hand for the Agra Tea Company with its fine property when a much more satisfactory dividend will be declared. The case is very different with the Drayton Company, which pays a magnificent 15 per cent and holds a very strong position with its fine compact Dimbula estates,—estates too, that can scarcely be said to have lost much of their pristine vigour duing the coffee era.

But now we come to a very different group of properties, in those appertaining to the Pitakande Company, (which also pays its shareholders 15 per cent); for, the Pitakande and Damboolagalla estates must have been first planted in coffee by Mr. R. B. Tytler not later than 1841-42; while Sylvakande and Kinrara are also among our very oldest coffee plantations. In 1878, for instance, when coffee had reached its maximum, this group of Matale estates is returned in our Directory for almost exactly the same acreage of coffee as is now under tea. Here is how the group stood in 1878:—

Pitakande	... 300 acres coffee up to	37	years old.	
Damboolgalla	... 300	"	"	"
Sylvakande	... 338	"	34	"
Kinrara	... 203	"	"	"
Total	1,141 acres coffee.			

And the Pitakande report gives 1,144 acres of tea on land, which has nearly all been in continuous cultivation from 50 to 60 years! It is, of course, when we take the results in crop that surprise and satisfaction may be felt; for, Mr. Fraser has brought his average yield up to 728 lb. per acre, with a maximum of 1,025 lb. Surely no such result has ever been achieved before on land so long in cultivation and it is all due to judicious manuring, the effect of which Mr. Fraser demonstrates to be cumulative. When tea is turned out at a cost of less than 23 cents per lb., or without manuring at 18·40 cents, while the nett return is over 36 cents, we need not speak of success—it is self-evident; and verily the working of the Pitakande Company affords an object lesson of a very attractive character to all tea cultivators; for, apart from the age of the estates, it must be remembered that the elevation—1,500 to 3,000 feet above sea-level—of the properties does not justify any expectation of more than ordinary teas.

THE USES OF TEA SEED OIL.—Tea seed oil is regularly used in Hongkong and the Southern parts of China as an illuminating oil. It will not, however, burn in a cold climate. We have in former issues, says the *Indian Planters' Gazette*, pointed out the many uses to which tea seed oil may be put. When tea seed becomes a veritable drug in the market,—and the day does not appear so very far distant,—planters may turn their attention to expressing the oil, and find a profitable market by so doing. We are aware that one or two planters tried experiments with tea seed oil, but they were on such a small scale that for commercial purposes they were valueless, and afforded no criterion to go by. An old skipper who has had considerable experience in the China seas, informs us that in the China trade, tea seed oil was looked upon as the best vegetable oil for preserving wood, owing to its possessing great penetrating power on dry wood; and that if it is put on fairly thick on the underwater side of a ship's wooden deck exposed to the hot sun, it comes to the surface in a few hours and materially adds to the hardness of the deck and to its life. The penetrating properties of tea seed oil on wood are superior to the ordinary bright varnish or pine oil in common use for preserving wood in Europe, and, like coconut oil, it possesses the peculiar property of shrinkage.

PLANTING NOTES.

SWEET POTATOES.—Here is what a Jamaica planter has to say regarding his method of treating vines of sweet potatoes:—"Cut in pieces the right length to plant (about 15 inches long) and pile them in a house or some other shade where they are entirely concealed from the sun, and wet them with water and let them lie in a pile until little roots put out, which will take a day or two; then stick them out in well prepared moist ground or in dry ground and water them, and you will hardly lose a plant. Stick them down with a small stick and if you water them do not fill the hole."—*Journal of the Jamaica Agricultural Society.*

CURING OF LIBERIAN COFFEE.—One of the drawbacks to the use of Liberian Coffee has been a strong unpleasant taste, and various remedies have been suggested. According to the *North Borneo Herald* it has now been successfully overcome on the Borneo Coffee Co's estate in Marudu Bay by washing the coffee after pulping and before fermenting. The washed coffee is in this way cleaned from all the minute bits of pulp which doubtless imparted an unpleasant taste and before being placed in the fermenting cistern it is thrown into large baskets—"coal baskets"—for a few minutes to allow the surplus water to drain off and is then fermented in a comparatively dry state. To increase the heat sacks are placed on the top of the coffee and after some hours the top layer is turned in below so as to ferment the parcel equally. The "tip" may be worth something, but we are somewhat inclined to lower our estimate of its value after reading our contemporary's further remarks, viz.:—"Liberian coffee, properly cured, has a splendid flavour which is wellknown by the trade who value it highly owing to the amount of chicory it can assimilate. As an after dinner coffee nothing comes up to pure Liberian coffee if properly cured."—*Planting Opinion*, March 31.

THE SUPPLY OF RUBBER.—An American who, for some time, has had charge of a rubber estate in Peru, from which the profits are small because of the difficulty about labour, is convinced that a great part of the Amazonian rubber resources have not yet been touched; but as new districts are gone into, the labour supply becomes worse, increasing the cost of collection.—Mr. C. D. Scott, of Nicaragua, reports rubber culture a failure in Central America; but we see it stated that the American Government is planning a series of experiments in Cuba, Porto Rico and the Philippines to demonstrate whether rubber can be produced in these islands. As the United States imports of rubber have increased as follows:—

Year.	Pounds.	Import Value.	Average Price.
1897	42,159,129	$21,670,019	51·4 cents.
1898	44,236,070	25,937,108	58·6 ,,
1899	54,408,495	34,219,019	62·9 ,,

It can be judged how important is the trade in the Far West.—Just as we are writing, there reaches us from a Colombo merchant, an order for several of our "rubber manuals" for use in Central Africa and the Manager of the Company concerned adds below his order:—

British Central Africa exports a very good quality of rubber at present, but in a year or so the supply will be exhausted, unless steps are taken to plant up; for at present it is only growing wild and the natives usually exterminate the vines in collecting the rubber."

COFFEE HULLING: DUTCH EAST INDIES.—A French Official Report from Java says:—The coffee-planter has always been very desirous of finding a huller which, whilst not deteriorating the bean, would at the same time be able to deal with different kinds of coffee. The problem has now been solved by M Schaap, one of the planters, who has invented a machine which can hull all the kinds of coffee grown in the colony. At the last coffee-planters' congress held at Malany in Oct. 1898, a prize of 2 000 florins was voted for the improvement of Schaap's system which could be made lighter, more economical in motive power, and able to treat at least three piculs per hour. Coffee hullers come generally from England and Germany, but on many plantations this work is still done in a very rudimentary way. The U S A are now introducing machines made by the "Engelberg Huller Co.," of Syracuse, New York. They are giving great satisfaction and will soon become very widely spread.—*Planting Opinion*, March 31.

DR. MORRIS'S SCHEME FOR AN AGRICULTURAL DEPARTMENT—is not to be accepted in Jamaica without criticism and opposition. A Mr. Robert Craig writes very pungently on the matter and we quote as follows:—

A Board of Agriculture of nominated persons giving voluntary services, will not, I feel assured, be the solution. The department ought to have a capable responsible head, and to aid him an advisory Board of practical men representing the different branches of agriculture, and also commerce might be at his service. These men should be paid a fee to ensure regular attendance at meetings, I say this because few men connected with agriculture can today afford the necessary outlay for travelling expenses. The head of the department should be a man really interested in agriculture, with some knowledge of it, and if possible, with a training such as tho work of the English Board of Agriculture would furnish. His first duty would be to promote good agriculture in every way—to help on Agricultural education and training—to advise the Government as to measures likely to advance and benefit agriculture—to facilitate the transport and inspection of produce—to assist in the suppression of contagious diseases in animals, and the improvement of their breeds, to collate statistics and generally maintain a bureau of agricultural information open to any one in or out of the Colony. The Agricultural Chemist should belong to his department, and the Public Gardens might be utilized for experimental purposes—whether the head of the Batanical Department should be subordinate is I think very doubtful—my own opinion is that he should not.

Agricultural and Botanical researches are not closely allied, and it has always appeared to me unjust and even absurd to regard, as many persons do, the Island Botanist as a referee in agricultural matters. If the Island cannot afford to maintain a Botanical Department—although that is not my opinion—it would I think be better to abolish it than attempt, as our economy, to amalgamate it with an agricultural bureau. A high degree of science should not in my view be aimed at, while the practice of agriculture remains primitive and so defective.

I am strongly opposed to the domination of the Secretary of State in this matter, and to the inclusion of Jamaica in Dr. Morris's Department of Agriculture for the West Indies. If a grant of money involves either control, it should, in my opinion be refused. It is certain, it would be a mere pittance, and to abandon our freedom of action for a dole would be contemptible.

The result was a special meeting of the Jamaica Agricultural Society on 25th Jan., largely attended, when after a full discussion, a special Committee was appointed to consider the Report recommending an Agricultural Department. Dr. Morris was not present and is not, of course, on the Committee.

Ramie Fibre Spinning Syndicate, Limited.—Registered on March 23rd, by Holman, Birdwood and Co., 50, Lime-street, E,C., with a capital of £15,000 in £1 shares. Object, to adopt an agreement with J. F. Woods, and to grow, cultivate, manufacture, and deal in rhea and other fibre. The first directors (to number not less than two nor more than seven) are to be appointed by the subscribers. Qualification, £100. Remuneration, one guinea each per board meeting attended. Registered office: 71-72, King William-street, E.C.—*Financial News*, March 30.

Indian Tea: Close of the Season and Prospects.—Here is the record from Messrs. Baines & Co. for the three past seasons:—

1897-98	...	147,070,755 lb.
1898-99	...	153,196,217 ,,
1899-1900	...	170,475,965 ,,

The detailed table below shews that, apart from the large increase of shipments to the United Kingdom, there are satisfactory increases in direct returns to America and Australia; but only a slight addition in the case of "foreign Europe." We direct attention to what is said in respect of prospects in the several districts for next crop. Hail-storms have done damage in Assam as well as, we may be sure from our special telegram, in Darjeeling; but there is no reason to suppose there will be an appreciative, if any, falling-off.

The Future of Coffee.—It may be of interest to coffee planters to consider to what extent prospects have improved since this question was first raised, and to try to ascertain what probability there is of the present level of prices being maintained or improved. The actual present price of coffee, says the *Madras Mail*, is a complete refutation of the gloomy forecasts of last year that planters must look forward to a long continuance of the prices then ruling. The following quotations from which exceptionally fine marks of both E India and Costa Rica coffee are excluded, show that the rise has been about 50 per cent for all classes of coffee:—

	Aug. to Oct., 1899	Feb., 1900.
No. 7 Rio.	4·30 to 4·50 cents per lb.	6·70 to 7·30 cents per lb.
Costa Rica Ordinary to Middling	28s to 52s p. cwt.	48s to 71s 6d p. cwt.
E India B ...	30s to 50s do.	50s to 74s 0d do.

As regards the effect of the recent rise in prices on the Brazil industry, it is to be remembered that nearly all Brazilian planters are heavily handicapped with mortgages incurred during the last four years of b d prices. Many planters have been ruined, and it will probably take some time to restore confidence in the industry. After the crisis of 1882-86, which was not nearly so severe in Brazil as the late crisis, it took five years of good prices to restore confidence, so as to increase the planted area; for it was not until 1896 97 that production began to increase materially. As the *American Grocer* recently remarked, it takes four years for coffee to come into bearing, and however low prices may stimulate planting, there must be a period of high prices before production can overtake consumption. In 1890 to 1898, moreover, Brazilian exchange fell rapidly. Now it is rising, and the chances are that it will continue to rise.

The Tomato as a Tonic.—The tomato has a high dietetic value and has been especially recommended for use in cases of blood impoverishment—a suggestion which, perhaps, rests upon the fact that it contains a considerable amount of iron. The presence of iron may easily be detected by applying to the cut surface of a tomato the ordinary re-agent. As a food for supplying iron, the tomato is far superior to any of the combinations of iron as commonly used as a means of enriching the blood. It has long been known that these inorganic compounds cannot enter into the composition of the blood It is possible, however, that they may sometimes be useful, for, as has recently been suggested, while they do not enter into the composition of the blood, they serve to neutralize acid substances which form insoluble salts with the iron of food, and thus prevent its absorption and assimilation. In other words they act as protectives of the nutritive iron compounds of food. The tomato may serve a similar purpose, and not only by supplying the source of iron, but the introduction of a larger amount than is needed, providing for the conservation of the amount actually required—*Journal of the Jamaica Agricultural Society.*

University Extension in Agriculture.—Mr. A. C. True has a paper in the *Forum* dealing with the American University Extension Movement on agricultural lines, at the head of which are the United States Department of Agriculture and the Agricultural Experiment Stations, which are departments of universities and colleges, and largely endowed by national grants of land and money. The American Department of Agriculture distributes 7,000,000 copies of 500 different publications annually. There are now fifty-six agricultural department stations in the United States, all of which publish reports of their own investigations:—

Under the direction of the agricultural experiment stations thousands of simple co-operative experiments in which farmers take part are now annually carried on in different parts of the country. They consist principally in the growing of different kinds of crops, such as wheat, grasses, sugar beets, vegetables, and fruits, or in the testing of different kinds of fertilisers as applied to the soils and crops in different localities. These experiments are performed in accordance with plans furnished by the experiment stations; and when they are conducted in the most effective way the co-operating farmers are visited, from time to time, by the officers in immediate charge of the experiments. Usually the experiment stations furnish the seeds, fertilisers, or other materials to be used in the experiments, while the farmers supply the land and the labour.

Farmers' institutes are also regularly held in at least thirty States. In th se States where they have reached their highest development their importance as educational institutions is very great. This is indicated by the number of institutes annually conducted. In New York, Pennsylvania, and Ohio hundreds of them are held each year; in Massachusetts there are now 125, with an attendance of about 13,000 persons; in Indiana about 100, with an attendance of over 25,000; in Minnesota 50, with an attendance ranging from 300 to 1,000; in Wisconsin 120, with an attendance of over 50,000. In Michigan institutes are held in nearly every county, and the total attendance is reported to reach 120,000. Sixty thousand copies of the annual bulletin of the Wisconsin institutes, in which the best addresses are grouped together to make a book of over 300 pages, are annually distributed. A copy of this book is put into very school library in the State.

Correspondence.

To the Editor.

THE CHEMISTRY OF COCONUT CULTIVATION.

SIR,—Mr. Cochran's contributions to the literature of agriculture are always of interest and profit. His last deliverance is no exception to the rule.

As regards Manuring, we are to a great extent groping in the dark. The fact and figures placed before us by Mr. Cochran are decided steps towards the goal of scientific manuring. More, and of importance, remains to be done. We want a complete analysis of all parts of the tree. Mr. Cochran gives us analyses of copra, husks, shells, milk and pasturage, but he has omitted the leaves, very important organs that play the part, both of lungs and stomach. A good head of leaves is of great importance to the tree, to assimilate the food taken up by the roots. What is of great importance and should be borne in mind, is that the mineral constituents of the leaves are richer in fertilizing matter than any other single product of the tree. According to the analysis of Lepine, the leaves have less chloride of sodium and potash than only the husks, and have over 5-6ths of phosphate of lime, of the total quantity in every other part of the tree. And they have more lime than every other part of the tree. This will demonstrate the importance of manuring, not only for crop but for leaves.

It will be interesting to compare the mineral matter removed by the soil by 80 nuts per tree per annum according to Messrs. Lepine and Cochran. It is necessary to bear in mind that the latter gentleman's analysis includes only every part of the nut, while those of Mons. Lepine are of every part of the tree. The figures are in round numbers without decimals :—

LEPINE.	lb.
Chloride of Sodium	100
Potash	734
Phosphate of Lime	300
Salts of Lime	262
COCHRAN.	lb.
Potash	101
Phosphoric Acid	18
Chloride of Sodium (previous analysis of)	1
Lime „ „	·97

According to Lepine all parts of the nut remove in mineral matter by 80 nuts :—

	lb.
Chloride of Sodium	48
Salt of Potash	530
Phosphate of Lime	27
Salts of Lime	116

This is a great deal higher than Mr. Cochran's analysis.

However if, as I maintain, we must, manure for the proper growth of the tree and for the production of nuts, the manure we apply must be on the basis of Lepine's analysis. But the question will naturally arise, can Lepine's analysis be accepted as absolutely trustworthy and correct? In July 1897, Mr. Cochran had occasion to analyse the husk of a coconut. The result proved so divergent from Lepine's analysis as tabulated by Davidson, that he felt compelled to impugn its correctness, or attribute the difference to the difference in the soil on which the trees grew. Mr. Davidson himself is not inclined to place absolute reliance on Lepine's analysis.

Mr. Cochran will be adding greatly to the obligation under which coconut planters are to him, if he will add to his analysis of the whole coconut, Lepine's analysis of the other parts of the tree and suggest a mixture sufficient to meet the annual drain on the mineral constituents of the soil. The mixture suggested by Mr. Davidson, to replace the mineral matter removed by 75 trees yielding 80 nuts per tree per annum is :—

	lb.
Salt	25
Wood ashes	240
Bones	45
Lime	15

Mr. Jardine's mixture which provides for organic matter as well, per acre, is

	lb.
Castor cake	900
Bone dust	300
Wood ashes.. ..	900

or the half of that for one year. This mixture errs on the side of liberality. It will be interesting to now compare the mineral constituents removed by 75 trees yielding 80 nuts per annum as given by Lepine, with the mineral constituents returned to the soil by Mr. Jardine's mixture :—

LEPINE.	lb.
Salt	100
Potash	734
Phosphate of lime ..	300
Salts of lime ..	262
JARDINE.	
Potash	374
Phosphoric acid ..	51

The number of cattle that 100 acres of coconut land can support in full health and feed depends on many circumstances—climate, soil, age of tree &c. A wet climate and a rich heavy soil will of necessity produce more pasturage than a light soil in a dry climate. Grass grows more luxuriantly, sometimes too luxuriantly, on a young plantation than on one whose leaves shade the soil and whose roots are in full occupation of it. On an old plantation on soil with body, there is an even sward; on a light, sandy soil the grass seems to grow in individual blades and in tufts. Under these circumstances, it is not safe to fix the number of cattle that 100 acres of coconut land can keep in food. I am inclined to think that on old plantations with average soil, two acres for each head of cattle is fair; and on light sandy soil, where pasturage is scant, four acres for each head of cattle. So with the weight of grass per head of cattle per day. It is dependent on circumstances. I think 50 lb. of grass per head per day a high average and exceptional.

Since the above was written I have read with much interest and profit Mr. Jardine's letter.

My experience is one with Mr. Jardine's of the value of the droppings of cattle tethered to trees at night. The cattle were only grazed on very poor pasturage and their droppings were dug in without the addition of the bones, castor-cake and ashes, Mr. Jardine rightly suggests, and the results were most encouraging—in fact better than the results of applying other manures. The trees had a head of dark green leaves and gave good crops for two years and the color of the leaves did not change to a yellow as is usual during a period of drought. I think the chief value of

cattle droppings is in the extreme solubility of their manurial constituents. A mixture approximating this will be of great value to coconut planters.

The system of carting husks and burning them with leaves, between every four trees, is a rational form of cultivation; but its cost is against it being carried out on a large scale. The more economical system would be to burn the husks where the coconut heaps are, and to appply to each tree, when manuring, ashes representing the husks of twice the annual average crop.

Mr. Jardine's experience of "hungry" soils must be the experience of all those who unfortunately have to do with them. A very large proportion of the manure applied goes to build up the tree and a very little to put on crop. If manure be not applied to trees growing on such soils every other year, the results of less frequent applications are positively *nil*.

Mr. Jardine's heresy as regards the use of salt in coconut cultivation is unfortunately not his only heresy. I always maintain that even if salt was not a manure, it was of great value agriculturally, owing to the chemical and mechanical changes it caused in the soil, more especially in heavy soils. Mr. Davidson, than whom perhaps no more competent man ever engaged in the cultivation of coconuts, and who was the Gamaliel at whose feet Mr. Jardine as a young man learnt the lessons in coconut planting which entitle his opinions to respect, held very decided opinions of the value of salt in coconut cultivation. I am a great believer of the use of salt in coconut cultivation especially in inland districts having heavy clay or alluvium soils. Perhaps if Mr. Jardine gives salt a trial, say on ten acres, he may find the yield of nuts so increase that he will apply it on a large scale and will no more be able to say: "I have never known any estate in Ceylon where the trees have 90 nuts each, per annum, over any extent of land." He will then be under no necessity to "go a long distance to see it," as he will be residing on it. B.

PAPER MAKING FOR CEYLON.

SIR,—Will anybody tell me why ordinary printing papers are not manufactured in Ceylon. I am not unfortunately a chemist, or a paper expert, but I think I am right in saying that, within 20 miles of Colombo, there is an opening for this industry, not merely as regards its local sale, but in respect to the supply to the Far East and India.

Of course Ceylon mills would have to do what the Indian mills have to do: import (not necessarily from Great Britain) from other countries a great part of the chemicals used in the manufacture.

There is plenty of water power not far from Colombo, which would meet all the requirements of a mill working both day and night, and all through the year if sufficient demand arose.

If a paper mill could be established in the vicinity of Colombo I need hardly say how valuable it would be (1) to the local papers; and (2) to all other consumers of papers. Once start the industry and each of the several branches would rapidly develop.

By simple machinery, though I do not say it would not be costly, the light timber on our hills could be floated down to a convenient point, and then converted into wood-pulp, and could be used on the spot in the manufacture of paper or exported to Indian mills.

The light wood (easily re-grown) is what is wanted, and mixed with constituents Ceylon possesses would probably prove of great value in the making of good paper.

It would pay the Government to have a special report made by an expert on the subject; if the Government decline, why should not the Chamber of Commerce take the question up? Our fibres and grasses are not sufficiently valuable for export to other paper-making countries, but delivered to a paper-mill near at hand they would be a most remunerative help in producing the material required for good paper for writings and printings of various qualities.

The volume and quality of the water available at the spot where the mill is placed must also be taken into consideration.

Paper is now and has been rising in price in England, India and America: the paper market of England, if ever shut off by war with the Continent, will take a leap, the extent of which few can suspect; and I write this letter in view of the possibility (and may I hope the probability of Ceylon stepping in the way and trying establish a paper mill on the banks of one of the rivers or canals on this side of the island that would at any rate feed part of our local supply at once, and in due course become an industry of considerable benefit, not only to Ceylon, but to neighbouring countries.

It seems to me that the local Government would do well, as they cannot take the initiative, if they were to offer a prize through Ceylon, English, American or Australian papers of a fairly substantial amount which would result in an experiment being carried out on lines that I have ventured to refer to. WANDERER.

Herewith a cutting which I met with after writing the above:—

The offer of the New Orleans *Times-Democrat* to give 500 dols. as its share of a prize to be offered by the newspapers of the United States to the inventor who may find a cheap and suitable substitute for wood pulp in the manufacture of paper has brought forth suggestions of cotton-wood or sweet gum, bagasse or the refuse from sugar-cane, cotton-seed hulls, rice straw, and pine straw as the substitute. Against these products of the South the objection has been made that they do not quite reach the market. But the *Times-Democrat* is urging chemists and inventors to do all in their power to overcome the suggested difficulties. W.

THE INDIAN MUSEUM, CALCUTTA.

Indian Museum, Calcutta, March 4th.

From GEO. WATT, Esq., M.B., C.M., C.I.E., etc., Reporter on Economic Products to the Government of India.

SIR,—I have the honour to acknowledge, with many thanks, the receipt of your letter dated the 3rd March 1900, together with the marginally noted publications.* These have been recorded as presented by you and placed in the Commercial Room of this Museum.—I have the honour to be, sir, your most obedient servant.

GEO. WATT, Reporter.

[Dr. Watt having applied for one or two of our publications for his Museum, we sent him several more. Hence this acknowledgment.—ED. *T.A.*]

* 1.—Ceylon Handbook and Directory, 1898-99.
2.—The Coffee Planter's Manual.
3.—All about Rubber.
4.—Map of Ceylon, on rollers.
5.—Map, Ceylon Plantations, on rollers.

TEA IN CHINA AND ITS CULTIVATION, &c.

March 30.

DEAR SIR,—It may be interesting to some of your readers to know what Samuel Ball in his book on Cultivation of Tea in China has to say incidentally on the effect of manure on the lasting qualities of the tea bush.

In the first place the Chinese did not manure the 'black tea,' because for one reason the demand would not make it profitable and also because as one of these authors says:—'That tea is the most fragrant which is not manured.'

They do not manure it, but Mr. Ball goes on to quote a Spanish missionary's account of its culture:—"Every year in February and August the ground is weeded, raking up even the grass. When the ground is hilly, and appears exhausted and sterile, after having weeded it in February, it is usual to go and dig soil from a neighbouring mountain and bring it and place it around the roots of the shrubs. If this soil be previously exposed to the sun or burnt, it improves it.' And of such tea he says '*it will last fifty years.*'

With regard to the 'green tea' culture we read:—'The shrubs are manured twice a year, in spring and autumn; the ground weeded and turned up about the roots four times a year. In about seven years they are cut down, nearly close to the ground, to produce an exuberance of succulent shoots and leaves; and *in about thirty years* they become useless, when they are rooted up.

It is impossible scientifically that these tea bushes should differ in lasting power intrinsically, though of course, the 'green tea' is grown in the soil of the plains and the 'black tea' in the mountainous soil. Yet discarding that factor it is shown that the highly manured 'green tea' does not last so long as the *un-manured* 'black tea.'

In reality this is an argument for scientific manuring as against the injurious stimulating of the plant with constant applications of ordinary manure, for the virgin soil from a neighbouring mountain added to the black tea would contain all the good qualities which the soil of that district had been chosen for possesssing.—Yours, etc., Z.

[But the difference between "green" and "black" tea is all in the preparation, not in the bushes—though perhaps the Chinese make a distinction. ED. *T.A.*]

PROPOSED PERIODICAL TOURS OF THE SCIENTIFIC OFFICERS OF THE R. B. GARDENS.

Planters' Association of Ceylon Kandy, March 30.

DEAR SIR,—I herein enclose, and would invite attention to, letter received from the Director of the Royal Botanic Gardens, Peradeniya, on the subject of proposed periodical tours by the new scientific officers of his department, which speaks for itself. Commending the scheme to cordial co-operation by those interested.—I am, dear sir, Yours faithfully, A. PHILIP.

From the Director, Royal Botanic Gardens, Peradeniya, to the Secretary, Planters' Association, dated 28th, March, 1900, subject:—

TOURS OF ENTOMOLOGIST AND MYCOLOGIST.

SIR,—I have the honour to inform you that the periodical tours of the new scientific officers of this department will shortly be commenced, and to ask your assistance in making them of as much value to planters and to the work of the officers themselves as possible. It is impossible for them to go over every estate looking for diseases, and they must depend upon the help of the planters for information. I propose that, if you agree, I should give notice to you some time in advance of the districts proposed for visitation and the approximate dates. If you would then be so kind as to inform the local Committee, perhaps a meeting could be arranged between the travelling officer and the Committee to discuss the diseases, etc., prevalent in the district (the Committee having previously collected information from the planters of their district). At this meeting arrangements could then be made for visiting particular estates, and notice given to planters as to the movements of the officer concerned in the district.

As a definite instance, I may mention that the Entomologist is going to Batticaloa to reach that place about April 15th and that he proposes to visit the Badulla and Passara districts either on the outward or homeward journey.—I am, sir, your obedient servant,

(Signed) JOHN C. WILLIS,
Director, Royal Botanic Gardens,

COCONUT PALM CULTIVATION IN CEYLON:

THE VALUE OF DIFFERENT MANURES; THE VALUE OF SALT; DOES ANY ESTATE IN CEYLON GIVE 90 NUTS PER TREE PER ANNUM?

April 2.

DEAR SIR,—I have read with very great interest Mr. Cochran's most useful paper on "Coconuts and Chemistry," (see page 764). I am sure that all who are interested in the cultivation of the coconut palm will appreciate highly the care and trouble Mr. Cochran has taken to place before them, such full and valuable information on the subject of the proper manures to be used in securing the best results in the cropping of their trees. Mr. Cochran's analyses being authoritative, we cannot do better than to endeavour to follow his advice, and to restore to the soil the manurial ingredients removed from it in crops of nuts, in the proportions pointed out by him.

I have not much faith in the value of cattle-shed manure where the cattle are fed only on the grass of the estate, and a ot of weeds and grass are thrown in daily to swell the bulk; for, by the time the manure is sufficiently rotted to allow of its being applied, it will have lost its most valuable constituent, ammonia; and the chief value of what remains will, in my opinion, be its mechanical action in the better subdivision of the particles of the soil. I should not apply manure of this description alone, but it would be a useful addition to bones, castor-cake, &c. Even the droppings of cattle, fed largely on oil cakes—as in the case of animals used in chekko yards,—loses much of its value after a short exposure, and is greatly inferior in results to that obtained where cattle are tied direct to the trees and the manure dug in so soon as they are removed to other trees. The very best results are obtained by tying two head of cattle to each tree

at night, spread evenly the droppings in a 6 foot radius and scatter upon this 3 lb. finely grown bone dust and 4 lb. white castor-cake, then dig to a depth of six to eight inches, mixing the soil and manures in the process; upon this dug-surface sprinkle 8 to 12 lb. good wood ashes and rake lightly in. The object of applying the ashes on the surface is to allow of the soluble potash being absorbed by the soil, in its passage down with the rain water, before it can get below the reach of the feeding rootlets. Where cattle are not available for tying to the trees, good chekku yard manure or white castor-cake must be used.

I have seen good results follow the application of *lime* to reclaimed swamp and low-lying land, and on lands containing much marl and clay. Its cost, however, in some districts prevents its being used to any great extent. With reference to the insufficient amount of potash in the mixture I recommend, I wonld point ont that the husks are never allowed to be removed from the land, but are carted out to the field, and the quantity of husks removed from the average field of nuts per tree per annum are burnt between every four trees; thus the potash removed from the soil by the husks is each year returned to it, and it is only necessary to add what has been removed in the kernels, water and shells, and the quantity I allow, Mr. Cochran says, slightly exceeds this. Where husks are removed, or where they are burnt in large heaps and the ashes applied to only a few hundred trees, as is too often the practice, the quantity of ashes or potash in some other form, equal to what is removed in the husks, should be added.

Mr. Cochran's analyses refer only to the manurial ingredients removed in the crops of nuts, but takes no account of what is taken up by the roots, stem and leaves of the tree for their maintenance in health and vigour. My experience has taught me that when an estate has been at all neglected, or where the soil is a hungry one, a very large proportion of the manures of the first and second application, goes to build up the trees and fit them to bear crops; and even after the trees are in full vigour, a certain proportion of the manures of subsequent applications, must go to keep them in that condition; so that when manuring is first begun upon an estate it would be well, in the first and second applications, to allow one-third more than would be necessary afterwards.

Never having applied salt to coconut trees I cannot speak as to its value. If it really is a necessary ingredient in the successful cultivation of the coconut tree then nature, in her chemical laboratory, is able to produce it from substances existing in the soil, else how is it that we find trees from 40 to 60 miles inland growing and cropping better than most of those within the influence of the sea breeze? Salt, like lime, I believe to be a solvent of animal and vegetable substances in the soil and a destroyer of vermin and weeds, but that it is a manure, in the true sense, I doubt.

I have never known any estate in Ceylon where the trees have 90 nuts each, per annum, over any extent of land, even with high cultivation; and I much doubt if there is any such estate in Ceylon. If there is, I would go a long distance to see it. I admit that under exceptionally favourable conditions there are fields, even up to 100 acres, which produce 90 nuts per tree and even more; but those are exceedingly rare. It is a very general practice with native owners of coconut property when asked as to the yield per acre to reply that they get so many nuts at a picking, and they are sure to name the largest number gathered at any one picking. Now this is very misleading, as no two pickings are alike. If the two largest pickings of an estate for the year are, say, 100,000 nuts each, the next largest will be about 70,000, and the remaining three will be say, from about 30,000 to 40,000 each picking.

Messrs. Freudenberg and Baur have introduced several manures which have not been much in use until recently, but are now having a fair trial. It would be interesting and useful if either of these firms would supply us with the information as to the money value of the unit of nitrogen, potash and phosphoric acid in their manures as compared with its value in white castor-cake, bone dust and wood ashes. W. J.

COCONUTS IN MATALE.

Awliscombe Estate, Matale, April 11.

SIR,—Coconut planters have been much interested in the articles appearing in your esteemed paper, on the subject of coconut cultivation. The district of Matale, though famed for cacao, has not yet drawn the attention it deserves in the matter of coconut cultivation. This estate, situated on the North Road six miles from Matale, was planted with coconuts and tea in the latter end of 1896. It was abandoned in the middle of last year and purchased by Mr. C. M. Fernando two months ago, since when I have been in charge. A palm, which the kanakkapulle, who was in charge tells me, was planted just three years and five months ago, is in bloom, and contains three separate bunches and two flowers. Other trees give promise of an early blossom. The plants came from Veyangoda and were from six to eight months old when laid down—the estate was never manured and the land was originally in chena. Does it not seem as if Matale North is deserving the attention of those interested in the staple product of the island?—I remain, sir, yours faithfully,

LEO. P. FERNANDO.

MINOR PRODUCTS REPORT.

CINNAMON.—In auction 26 packages Ceylon offered and part sold at 8d per pound for coarse and 6d for low. Of "wild" bark 621 packages offered, and 200 sold—thick bark 1⅛d to 1⅜d, broken quill ¾d. and thin quill 1¾d to 2½d per lb. Chips and bark dull of sale.

CINTRONELLA OIL.—The market is easier inclined since the auction sale of last week. It is reported that 10¾d per pound c. i. f., has been refused this week for drums. 11d being wanted. In cases 11½d is quoted on the spot.

LEMONGRASS OIL.—Dull of sale at 2⅞d to 3d per ounce spot,—*Chemist and Draggist* March 24.

RAINFALL RETURN FOR COLOMBO.

(*Supplied by the Surveyor-General.*)

	1895.	1896.	1897.	1898.	1899.	Av of 30yrs.	1900.
	Inch.	Inch	Inch	Inch	Inch.	Inch.	Inch.
January ..	5·00	2·92	3·81	2·32	6·98	3·22	3·72
February ..	0·81	0·35	1·68	1·98	2·78	1·93	0·63
March ..	1·84	5·64	3·66	4·21	0·88	4·78	3·71
April ..	9·34	5·93	10·97	22·81	6·66	11·31	15·12
May ..	10·09	9·31	8·30	5·80	17·73	12·09	4 96*
June ..	13·99	8·37	10·14	10·94	9·23	8·37	
July ..	0·52	2·85	5·24	6·15	1·11	4·38	
August ..	0·92	6·35	9·09	0·97	0·62	3·67	
September	4·09	10·99	4·58	6·90	1·48	5·01	
October ..	30·36	16·78	4·71	20·60	12 99	14·52	
November..	5·83	19.81	11·66	17·38	8·58	12·66	
December..	9·44	11·76	8·89	3·05	4·44	6·39	
Total..	92·23	101·06	82·73	103·11	73·48	88·33	28·14

* From 1st to 2nd May 4·96 inches that is up to 9·30 a.m on 2nd May.—ED. *T.A.*

Ceylon Rainfall.

THE P. W. D. METEOROLOGICAL OBSERVATIONS OF MARCH, 1900.—We append the Monthly Return of rain from which it will be seen that the highest fall in March, was at Haldummulla in the Uva Province, 14·67 inches and the lowest at Pallai in the Northern Province, 0·10 inches.

WESTERN PROVINCE.

Negombo, Mr. Bucknall (6) ... 0·20
Kalutara Mr. Gregson (36) ... 1·85
Labugama, Mr. Bond (369) ... 4·78
Henaratgoda, Mr. Silva (33) .. 2·82

CENTRAL PROVINCE.

Katugastota, Mr. Morgan (1,500) ... 1·48
New Valley, (Dikoya) Mr. Ward (3,700) .. 7 40
Helboda (Pussellawa) Mr. Anderson (3,300) .. 2·67
Yarrow Estate, Mr. Peto (3,400) ... 5·05
Peradeniya Mr. MacMillan (1,540) ... 7·28
Duckwari, Mr. Edwin (3,300) ... 0·34
Caledonia, Mr. Goork (4,273) .. 3·00
Pussellawa, Mr. Powell (3,000) .. 3·67
Hakgala, Mr. Nock (5,581) .. 1·11
S. Wanarajah Estate, Mr. Tatham (3,700) .. 9 45
Padupola, Mr. Ward .. (1,636) ... 1·72
Mylapitiya, Mr. Fletcher (1,707) ... 0.50

NORTHERN PROVINCE.

Mullaittivu, Mr. Sanmukam (12) .. 1 10
Jaffna Mr. Kretser (8) 0·34
Mankulam, (N. Road) Mr. Walker (167) ... 1·44
Elephant Pass, Mr Silva (7) .. 1·11
Vangalachettykulam, Mr. Oorloff (179) .. N l
Point Pedro, Mr. Chit mpalam (24) ... 0·34
Jaffna College, Mr. Cooke (9) Nil
Kayts, Mr. Kretser .. (8) .. Nil
Kankesanturai, Mr. Pararachasingha (10) .. 1·84
Pallai, Mr. Silva (24) .. 0·10
Murikandy, (North-Central Road) Mr. Silva — 1·00
Nedunkenl, Mr. Sanmukam (122) ... Nil
Chavakachcheri, Mr. Silva (16) ... 0·75
Udupiddi, Mr. Bowes (35) .. 1·12
Marichchukaddi, Mr. Thamotharampillay (14) 0·50
Murungan, Mr. Ramalinkam (52) 0·93
Vavuniya Mr. Walker (318) 2 53

SOUTHERN PROVINCE.

Ella Vella Mr. Caldicott (262) 2·55
Kekauadura, do (150) 2·82
Denagama, do (286) 0·62
Udukiriwila Mr. Lourenz (235) .. 1·06
Kirama, Not received (260) —
Hali-ela Mr. Caldicott (200) 3·70
Tissa Mr. Peries (75) ... 1·36
Matara Mr. Caldicott (15) 0·81
Dandeniya, do (157) .. 5·87
Urubokka, Mr. Caldicott (890) 6·15
Tang lla Mr. Fox (94) .. 2·60
Mamadola, Mr. Cade (56) .. 1·15

EASTERN PROVINCE.

Irrakkamam, Mr. E ge (42) ... 0·42
Devilana, Mr. Vanderstraaten (136) Nil
Sagamata, Mr. Edge (40) 0·40
Ambare, do (65) 1·11
Kanthalai, Mr. Carte (150) 0·31
Allai, Mr. Carte (95) Nil
Rukam, Mr. Vanderstraaten (120) ... Nil
Periyakulam, Mr. Carte (20) ... Nil
Chadaiyantalawa, Mr. Edge (57) 1·54
Kalmunai, do (12) Nil
Rotewewa, do (30) 0·.9
Lahugala, do (70) 0·30
Naulla, do (30) 0·30
Audankulam, Mr. Carte (41) ... Nil
Manalpuddy, Mr. Vanderstraaten (21) Nil
Maha-Oya-Tank, Mr. Vanderstraaten (190) Nil

N.-W. PROVINCE.

Magalawewa, Mr. Soopera-yan (176) .. 2·25
Maha Uswewa tank, Mr. Addams (160) ... 0·25
Tenepitiya, Mr. Churchill (8) ... 0·50
Batalagoda, Mr. Madakapola — 0·46

N.-C. PROVINCE.

Kalawewa, Mr. Emerson (268) 3·25
Maradankadawala, Mr. Emerson (443) ... 4·80
Mihintale, Mr MacBride (354) 3·40
Horowapotana, Mr. MacBride (217) .. Nil
Madawachchiya, Mr. MacBride (285) .. 0·90
Topare, Mr. Jayewardane (200) .. Nil
Minneriya Mr. Eves — Nil

UVA PROVINCE.

Bandarawela, Mr. Tocke (4,000) .. 2·00
Haldummulla, Mr. Viramuttu (3,160) .. 14·67
Kumbukan, Mr. Rowland (446) ... 3·69
Koslanda, Mr. Rowland (2,258) ... 14·33
Tanamalwila, Not received (550) .. —
Bibile, Mr. Silva (880) 1·62
Taldena, Mr. Fernando (1,100) .. Ni
Allutnuwa a—Mr. Leembrug-gen (300) 3·88

SABARAGAMUWA.

Ambanpitiya, Mr. Dassanayaka (729) 3·93
Pelmadulla, Mr. Clarke (408) 9·90
Kolonna Korale (Hulanda-oya) Mr. Dabre (203) 3·49
Avisawella, Mr. Clarke (105) .. 7·03

S. G. O. METEOROLOGICAL OBSERVATIONS FOR DECEMBER, 1899.

The following is the return of the total fall of rain for December, from which it will be seen that the highest fall was at St. Martins, Rangalla, 38·79 inches, and the lowest at Welhelmina, Puttalam 1·76 inches.

Colombo (40) 4·44
Ratnapura (84) 5·85
Puttalam (27) 2·38
Anuradhapura (295) 6·21
Mannar (12) 3·55
Jaffna (9) 3·23
Trincomalee (12) 20·16
Batticaloa (26) 21·90
Hambantota (50) 7·56
Galle (48) 4·42
Kandy (1,654) 7·60
Nuwara Eliya (6,188) 5·06
Hakgala, Nuwara Eliya (5,581) 8·56
Badulla (2,225) 12·11
Kurunegala (381) 6·55
Maligakanda, Colombo Mr. Johnson (70) 6·63
Agricultural School —
Colombo, Mr. Rodrigo 6·50
Passara Hospital, Passara (Mr. Thomasz) 2,200 7·72
Welhelmina, Puttalam, Mr. Ratnayeke (131) 1·76
Horakele Estate, Chilaw, Mr. Bevcu (50) ..
Chilaw Kachcheri Chilaw, Mr. Koch (10) 0
Franklands Estate —
Veyangoda, Mr. Beven 4·05
Orange Hill, Ragama Mr. Bury (50) 3·01
Henaratgoda Gardens, Henaratgoda, Mr. de Silva (33) 3·65
Kotua Godella, Rambukana Mr. Windus (580) ..
Eadella or Liberia Estate Polgahawela Mr. Craighead (425) 4·10
Geekianakanda, Neboda Mr. Towgood (200) ..
Polgahakauda, Neboda Mr. Wight (300) ..
Labugama, Hauwella, Mr. Bond (369) 8·06
Rayigam, Horaua, Mr. Dawson, (300) 7·59
Kanangma, Avissawella Mr. Cooke (200) 8·65
Dunedin Estate, Avis-sawella, Mr. Bayley, (400) 6·17
Digalla Avisawella, Mr. Tottenham, (400) 6·47
Pambagama, Avisawella. Mr. Bridgman (600) 9·53
Avisawella Estate Avisawella Mr. Byrde (250) 4·63
Yatideriya, Kegalla, Mr. Fairweather — 7·14
Mahawalatenna, Balangoda Mahawalatenna R. M. — 18·41
Agarsland Estate Balangoda Mr. Boyd (2,215) ..
Maduwanwala, Rakwana, Maduwanwela R.M. (750) 5·55
Anninkanda, Morawaka, Mr. Anderson, (1,400) 17·79
Panilkauda, Morawaka, Mr. Davidson. (1,900) 18·38
St. John Del Rey, Bogawantalawa Mr. Glanville (4,300) 6·19
Friedland, Bogawantalawa Mr. Rammell (5,200) ..
Campion, Bogawantalawa, Mr. Gidden, (4,840) ...
Blair Athol, Dikoya, Mr. Lane (3,641) 2·87
Aunfield, Dikoya, Mr. Knight (4,300) 2·66
Maskeliya Hospital, Maskeliya Dr. Brohier (4,200) 3·64
Hope Estate, Hewaheta, Mr. Bagot (5,000) 13·03
Coldstream Estate, Watawala Mr. Spedding (3,800) 1·37
Holmwood Est., Agrapatana, Mr. Gray (5,240) ...
Sandringham, Agrapatana Mr. Orchard (5,200) 3·21
Gingran-oya, Kotmale, Mr. Cox (3,800) 4·35
Labookeile, Ramboda, Mr. Stone (5,000) 12.33
Dunsinane, Pundalu-oya, Mr. Metcalfe 4,800 5·98
Sogama, Pussellawa, Mr. Eustace (3,500) 5·15
Kurundu-oya, Maturata, Mr. Corbetta (5,150) 16·69
Kabaragalla, Maturata, Mr. Maclean (4,400) 12·56
Maragalla Estate, Moopana, Mr. Betts, (2,200) 10,34
Mupana, Hospital, Mupana (Mr. Selai) (500) 9·11
Madulsima Hospital Lunugala Dr. Vethecan (4,600) 13·23
Meeriabedda, Haputale, Mr. Dupuis (3,600) 9·27
Udahena Estate, Haputale, Mr. Bisset, (4,400) 8·48
Haputale Hospital Haputale Mr. VanRooyen (4800) 10·41
Post Office, Bandarawela, Mr. Mendis (4,035) 6·99
Callander, Ohiya Mr. Green (5,125) ...
Mariawatte, Gampola Mr. Salmond (1,600) 3·83
Orwell Estate, Gampola Mr. Taylor (1,800) 2·97
New Forest, Deltota. Mr. Wardrop (3,500) 8·72
Rajawella, Estate, Telleniya Mr. Miller, (1,500) 4·51
Lower Spring Valley, Badulla Mr. Rettie (3,650) 12·34
Gourakele Estate, Badulla Mr. Hope (1,200) 9·15
Mousagala Estate, Badulla, Mr. Deaker (4,500) 10·52
Ledgerwatte, Badulla Mr. Rettie (4,000) 28·07
Hambegamuwa Tank, Badulla (Raubanda Korala) ... 7·87
Dea Ella Estate, M'walatenna Mr. Vanderslott (800) 8·82
Sembawatte Estate, N'pitiya Mr. Roe (1,600) 6·13
Gammaduwa, Estate, Rattota Mr. Westland (2,400) 21·87
Koboneila Estate, Rangala, Mr. Pole (3,300) 25·27
St. Martins, Rangala, Mr. Wyllie (3,600) 38.79
Crystal Hill, Matale, Mr. Van Starrex (1,400) 11·93
Vicarton Estate, Matale Mr. Carrie (3,250) 13·44
Matale Mr. Tisseverasinghe (1,208) 9·66
Wariapolla, Matale, Mr. Dickenson (1,200) 9·95
Dambulla, Mr. Sinnetamby (400) 11·72
Kotta Estate, Pallai, Mr. Todd (13) ...
Mantota Hospital, Mannar. Mr. Adams (17) 7·28
Buttala Hospital, Buttala, Mr. Somasundaram . 5·25
Police Station, Hatton Police Constable Miskin (1,141) 2·92
Medway Estate Nilaveli, Mr. Abraham, .. 15·82
Delwita, Kurunegala Mr. Neame (490) ...
Woodside, Uragalla Mr. MacMahon (3,000) 15·24
Gillardstown, Wattegama Mr. Hardy (2,500) 10·99
Ja-ela Hospital, Ja-ela Mr. Fernando (4) 2·94
Maspana, Uda Pussellawa Mr. Jones (2,000) 21·60

SHARE LIST.

ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company.	paid p. sh.	Buyers.	Sellers.	Transactions
Agra Ouvah Estates Co., Ltd.	500	900	..	900
Ceylon Tea and Coconut Estates	500	..	500 n'l	..
Castlereagh Tea Co., Ltd.	100	90	—	90
Ceylon Hills Estates Co., Ltd.	100	—	—	—
Ceylon Provincial Estates Co. Ltd.	500	—	500	500
Claremont Estates Co., Ltd.	100	—	—	—
Clunes Tea Co., Ltd.	100	—	—	—
Clyde Estates Co., Ltd.	100	..	—	—
Doomoo Tea Co., Ltd.	100	—	60	—
Drayton Estate Co., Ltd.	100	—	..	..
Ella Tea Co., of Ceylon, Ltd.	100	60	65	—
Estates Co., of Uva, Ltd.	500	220	250	...
Gangawatta	500	...	..	—
Glasgow Estate Co., Ltd.	500	905	—	...
Great Western Tea Co.,	500	640	—	—
Hapugahalande Tea Estate Co.	200	200	—	..
High Forests Estates Co., Ltd	500	500	525	525
Do part paid	350	...	400	—
Horekelly Estates Co., Ltd.	100	...	—	..
Kalutara Co., Ltd.	500	..	375	—
Kandyan Hills Co., Ltd.	100	—	70	—
Kanapedlwatte Ltd.	100	—	85	—
Kelani Tea Garden Co., Ltd.	100	40	..	..
Kirklees Estates Co., Ltd.	100	—	..	—
Knavesmire Estates Co., Ltd.	100	—	67½	...
Maha Uva Estates Co., Ltd	500	..	425	.
Mocha Tea Co., of Ceylon, Ltd.	500	600	...	—
Nahavilla Estate Co., Ltd.	500	—	450	...
Neboda Tea., Co. Ltd	500	..	500	..
Nyassaland Coffee Co. Ltd	100	—	..	..
Ottery Estate Co., Ltd.	100	..	—	—
Palmerston Tea Co., Ltd.	500	—	400	...
Penrhos Estates Co., Ltd.	100	—	100	..
Pine Hill Estate Co., Ltd.	60	40		..
Pitakanda Tea Company	500	..	—	..
Putupaula Tea Co., Ltd.	100	—	120	—
Ratwatte Cocoa Co., Ltd.	500	—	—	..
Raylgam Tea Co., Ltd.	100	52·50	60	—
Roeberry Tea Co., Ltd.	100	..	45	—
Ruanwella Tea Co., Ltd.	100	—	40	..
St. Hellers Tea Co., Ltd.	500	510	—	..
Talgaswela Tea Co., Ltd.	100	30	—	30
Do 7 per cent. Prefs.	100	...	..	..
Tonacombe Estate Co., Ltd.	500	—	450	—
Udabage Estate Co., Ltd.	100	..	—	—
Udugama Tea & Timber Co., Ltd.	50	—	..	..
Union Estate Co., Ltd.	500	—	275	—
Upper Maskeliya Estate Co., Ltd.	500	..	470	...
Uvakellie Tea Co., of Ceylon, Ltd.	100	—	70	...
Vogan Tea Co., Ltd.	100	..	80	80
Wanarajah Tea Co., Ltd.	500	..	1086	.
Yataderiya Tea Co., Ltd.	100	—	395	..

CEYLON COMMERCIAL COMPANIES.

Company.	paid p. sh.	Buyers.	Sellers.	Transactions
Adam's Peak Hotel Co., Ltd.	100	—	—	..
Bristol Hotel Co., Ltd.	100	—	85	85
Do 7 per cent Debts.	100	105	—	—
Ceylon Gen. Steam Navgtn. Co., Ltd.	100	212½	—	215
Colombo Apothecaries Co., Ltd	100	—	140	137·50
Colombo Assembly Rooms Co., Ltd.	20	12·50	..	..
Do prefs.	20	—	..	..
Colombo Fort Land and Building Co., Ltd.	100	...	85	85
Colombo Hotels Company	100	297·50	300	...
Galle Face Hotel Co., Ltd.	100	..	150	..
Kandy Hotels Co., Ltd.	100	..	117·50	...
Kandy Stations Hotels Co.	100	..	30	—
Mount Lavinia Hotels Co., Ltd.	500	150	200	..
New Colombo Ice Co., Ltd.	100	177½	—	177·50
Nuwara Eliya Hotels Co., Ltd.	100	30	...	31½
Public Hall Co., Ltd.	20	15	—	—
Petroleum Storage Co.	100	—	—	—
Do 10 % prefs.	100	—	...	—

LONDON COMPANIES *

Company.	paid p. sh	Buyers.	Sellers.	Transactions
Alliance Tea Co., of Ceylon,	10	8½	—	..
Anglo Ceylon General Estates Co.	100	—	35—40	..
Associated Estates Co., of Ceylon	10	—	3—5	...
Do. 6 per cent prefs.	10	..	7½	..
Ceylon Proprietary Co.	1	...	..	26¾ ex div
Ceylon Tea Plantation Co., Ltd.	10	—	24½—25½	—
Dimbula Valley Co., Ltd.	5	..	5½—6	—
Do prefs.	5	..	..	—
Eastern Produce & Estates Co.	5	...	5½—6	...
Ederapolla Tea Co.,	10	...	7—8	..
Imperial Tea Estates Co., Ltd.	10	...	5—6	..
Kelani Valley Tea Assocn., Ltd.	5	..	5—6	..
Kintyre Estates Co., Ltd.	10	7½	7—9	..
Lanka Plantation Co., Ltd.	10	4½	4—5	..
Nahalma Estates Co., Ltd.	1	—	½—¾	..
New Dimbula Co., Ltd.	1	—	2½—3	..
Nuwara Eliya Tea Estate Co., Ld.	10	...	—	...
Onvah Coffee Co., Ltd.	10	—	—	9¾ ex div
Ragalla Tea Estates Co., Ltd.	10	—	10	..
Scottish Ceylon Tea Co., Ltd.	10	—	14—15	.
Spring Valley Tea Co., Ltd.	10	3	4—5	..
Standard Tea Co., Ltd.	6	—	11—12	..
The Shell Transport and Trading Company, Ltd.	100	280	300	280
Yatiyantota Ceylon Tea Co., Ltd.	10	—	8—9	..
Do. pref. 6 o/o	10	—	9¾—10¼	..

BY ORDER OF THE COMMITTEE

Colombo, May 4th, 1900

* Latest London Prices.

THE LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.)
Colombo, May 1st 1900.

COFFEE:—	
Estate Parchment per bushel	None offering.
Chetty do do	None offering.
Native Coffee per cwt.	None offering.
do F. O. B per cwt.	None offering.
Liberian coffee:—per bushel	None offering.
do cleaned coffee:—per cwt	None offering.
Cocoa unpicked:—per cwt	None offering.
do cleaned do	None offering.
Cardamoms Malabar per lb	R1·00 to 1·10
do Mysore do	R1·35 to 1·75
RICE:—	
Soolai per bag of 164 lb. nett	R9·30 to 9·60
Slate or 1st quality:—per bushel	R3·43 to 3·48
Soolai 2 & 3rd. do do	R3·35 to 3·44
Coast Calunda	R3·95 to 4·00 Scarce
Coast Kara	R3·87 to 3·92 do
Kazala	R3·33 to 3·35
Muttusamba Ordinary	R4·50 to 4·62
Cinnamon per lb No 1 to 4	R00·55
do do 1 to 2	R00·66
do Chips per candy	R87·50 to 90·00
Coconuts Ordinary per thousand	R35·00 to 38·50
do Selected do	R36·00 to 39·50
Coconut Oil per cwt	R13·75 to 14·00
do do F. O. B. per ton	R275·00 to 280·00
POONAC:—	
Gingelly per ton	R128·00 to 132·50
Coconut Chekku do	R85·00 to 87·50
do Mill (retail) do	R85·00 to 87·50
Cotton Seed per ton	R80·00 to 82·50
Copra per candy	
Kalpitiya do	R44 50 to 45·25
Marawilla do	R43·00 to 44·00
Cart Copra do	R37·00 to 42·00
Satinwood per cubic feet.	R2·00 to 2·25
do Flowered do	R5·00 to 6·00
Halmilla do	R1·90
Palu do	R1·00 to 1·12
Ebony per ton	R75·00 to 175·00
Kitul fibre per cwt	R28·00 to 30·00
Palmyra do do	R8·00 to 15·50
Jaffna Black Cleaned per cwt	R14·00 to 15·50
do mixed do	R12·00 to 12·00
Indian do	R8·00 to 13·50
do Cleaned do	R10·00 to 15·50
Sapanwood per ton	R55·00
Kerosene oil American per cases	R8·25 to 8·35
do bulk Russian per tin	R3·52 to 3·60
do Russian per cases	R7-30 to 7·40
Nux Vomica per cwt	R2·00 to 3·50
Croton Seed per cwt	R23·00 to 28·00
Kapok cleaned f o b per cwt	R24·00
do uncleaned do	R5·50
Plumbago per ton, according to grade — Large lumps	R500·00 to 950·00
do	R400·00 to 850·00
Chips	R200·00 to 00·00
Dust	R75·00 to 500·00

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)
Colombo, 30th April, 1900.

CARDAMOMS:—
All round parcel, well bleached per lb. R1·45
Do. dull medium do. 1·10 } No transactions.
Special assortment, 0 and 1 only do. }
Seeds do. 1·35

CINCHONA BARK:—
Per unit of Sulphate of Quinine 9c—1 to 4 o/o

CINNAMON :—
Ordinary assortment per lb. 60c.
Nos. 1 and 2 only per lb. 66c.
Nos. 3 and 4 only per lb. 55c. Nominal

CINNAMON CHIPS :—
Per candy of 560 lb R90·00 Sellers at R97·50

COCOA :—
Finest estate red; unpicked per cwt None offering
Medium do do " } None offering
Bright native, unpicked and undried " }
Ordinary do do do " }

COCONUTS—(husked).
Selected per thousand R48·00
Ordinary " R40·00
Smalls " R30·00

COCONUT CAKE—
Poonac in robins f. o. b. per ton R80·00
Do. in bags R65·00

COCONUT (Desiccated).
Assorted all grades per lb. 13¾c

COCONUT OIL—
Dealers' Oil per cwt. R14·25 Business done at R14.
Coconut Oil in ordinary packages, f. o. b. per ton R317·50.—Market quiet.

COFFEE—
Plantation Estate Parchment on the spot per bus. —None offering.
Plantation Estate Coffee f.o.b. (ready) per cwt.—None offering.
Native Coffee, f.o.b per cwt.—None offering.

CITRONELLA OIL—
Ready do per lb. 65c—In drums of 800 lbs exclusive of packages.
do do per lb. 64c—In cases of 90 lbs.

COPRA—
Boat Copra per candy of 560 lb. R45·00
Calpentyn Copra do do R45·00
Cart do do do R42·00
Estate do do do R45·00

CROTON SEED per cwt R24·00

EBONY—
Sound per ton at Govt. depot R175.—As per last Government Sales, of 15th November.
Inferior R120.—As per last Government sales of 15th November.

FIBRES—
Coconut Bristle No. 1 per cwt R11·00
Do " 2 " 8·00
Do mattress " 1 " 2·75
Do " 2 " 2·00
Coir Yarn Kogalla " 1 to 8 18·00
Do Colombo " 1 to 8 16·00
Kitool all sizes 38·00
Palmyrah 16·00

PEPPER—Black per lb 28c.

PLUMBAGO—
Large lumps " per ton R950 } Small transactions.
Ordinary lumps " " 800 }
Chips " " 550 }
Dust " " 450 }
Do (Flying) 150 }

SAPANWOOD— per ton R54
SATINWOOD (ordinary) per cubic ft. R2·40

TEA—	High Grown Average.	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	63	46	34
Orange Pekoe do	57	44	34
Pekoe do	44	39	30
Pekoe Souchong do	38	33	28
Pekoe Fannings do	34	30	28
Broken mixed—dust, &c. per lb	28	27	26

CEYLON EXPORTS AND DISTRIBUTION 1899-1900.

COUNTRIES	Tea. 1900 lbs.	Tea. 1899 lbs.	Coffee—cwt. Plantation	Coffee—cwt. N'tive	Coffee—cwt. Total.	Cocoa cwts.	C'moms lbs.	Cinnamon. Bales lbs.	Cinnamon. Chips. lbs.	Coconut Oil. 1900 cwt	Coconut Oil. 1899 cwts	Copra cwts.	Desiccated Coconut lb.	Poonac cwts.	Coconuts. No.	Plumbago. 1900 cwts.	Plumbago. 1899 cwts.	Ebony cwts.	Sapanwood cwts.
To U K. ..	36381598	28746863	1576	..	1576	10308	145374	227664	91328	80445	35617	7779	1849604	..	2940976	30959	39898	280	4238
" Austria ..	2569	1041	..	..	..	..	..	...	19600	2220	851	5906	525	...	..	..	14	..	480
" Belgium ...	1880	8183	30	..	30	63	...	21134	24600	125	321	40670	34200	20974	...	13628	8252	...	..
" France ..	63632	43810	..	...	..	33	3407	68988	10604	...	...	13287	3602	201	..	..	306	220	..
" Germany ..	108551	122269	..	..	..	131	54323	168700	234138	3634	401	30409	323936	24296	250709	21772	23458	1730	2190
" Holland ..	2000	...	..	..	..	...	...	..	22400	..	..	..	49100	.	25050	912	2926	...	...
" Italy ..	2433	4550	..	..	..	...	430	37100	37296	..	205	1500	..	..	2048	...	..	45	...
" Russia ..	2315235	625030	15	..	15	..	..	..	...	..	..	26003	..	...	1590	...	..	..	..
" Spain ..	11970	5300	..	...	..	...	..	65000	16800	..	..	..	...	...	..	..	...	..	..
" Sweden ..	35235	12008	9	..	9	..	3958	2000	..	...	..	4403	...	..	..	105	208	...	...
" Turkey ..	7061	8494	..	..	..	..	1000	...	..	...	..	..	...	..	..	...	..	...	...
" India ..	202861	150850	58	4	62	...	22013	..	..	15016	9126	..	..	..	9500	69	93	..	23
" Australia ..	4669260	4276109	635	..	635	..	...	2700	8736	83	251	..	165942	..	..	554	729	...	.
" America ..	1733022	865938	72	..	72	278	..	141800	72800	26253	31221	..	616400	...	..	65345	81841	..	..
" Africa ..	58633	89044	..	..	..	..	1120	100	2408	...	..	..	9275	...	551055	..	..	..	...
" China ..	276023	322966	21	...	21	82	1800	10000	...	520	2773	..	22960	...	..	..	100	..	...
" Singapore ..	30776	18385	..	..	..	405	..	..	..	...	17812	..	...	..	—	...	..	...	..
" Mauritius ..	...	12390	..	..	..	..	...	...	..	..	..	...	...	..	...	..	...	..	...
" Malta ..	154053	67817	..	...	..	..	..	..	.	...	...	...	..	..	..	..	..	..	...
Total export from 1st Jan. to 30th April 1900	46056792	35381047	2416	4	2420	11300	233425	745186	540710	128296	98578	129957	3075544	45471	3780928	133344	160825	2275	6981

MARKET RATES FOR OLD AND NEW PRODUCTS

(From Lewis & Peat's Fortnightly Prices Current, London, March 21st, 1900.

	QUALITY.	QUOTATIONS.
ALOES, Soccotrine cwt.	Fair to fine dry ...	44s a 85s
Zanzibar & Hepatic ,,	Common to good ..	20s a 60s
BEES' WAX, ,,		
Zanzibar & Bombay { White ,,	Good to fine	£6 a £7 10s
Yellow ,,	Fair ,,	£5 15s a £7
Madagascar ,,	Dark to good palish	£6 5s a £6 12s 6d
CAMPHOR, China ,,	Fair average quality	175s
Japan ,,	,, ,, ,,	130s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	2s 6d a 2s 9d
	Middling, stalky & lean	1s 5d a 1s 7d
Ceylon.—Mysore ,,	Fair to fine plump ..	3s 5d a 4s 3d
	Seeds .	1s 6d a 2s 6d
,, Tellicherry ,,	Good to fine ..	2s 11d a 3s
	Brownish .	2s 6d
,, Long ,,	Shelly to good ..	2s 11d a 4s
,, Mangalore ,,	Med brown to good bold	2s 3d a 3s 3d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	3¼d a 4¼d
Madras ,,	..	
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	37s 6d a 47s 6d
CINCHONA BARK.—lb.	Ledgeriana Orig. Stem	3⅜d a 6⅝d
Ceylon	Crown, Renewed	5d a 7d
	Org. Stem	3¾d a 5½d
	Red Org. Stem	4⅜d a 5⅝d
	Renewed	5¾d a 7½d
	Root	3¾d a 4d
CINNAMON, Ceylon 1sts	Ordinary to fine quill	10d a 1s 8d
per lb 2nds	,, ,,	9½d a 1s 5d
3rds	,, ,,	8½d a 1s 4d
4ths	,, ,,	8d a 11½d
Chips	,, ,,	2½d a 8d
CLOVES, Penang lb.	Dull to fine bright bold	5½d a 9d
Amboyna ..	Dull to fine	4½d a 5½d
Zanzibar }	Good and fine bright	4⅜d
and Pemba }	Common dull to fair	4d a 4¼d
Stems ..	Fair	1¾d
COFFEE		
Ceylon Plantation ,,	Bold to fine bold colory	100s a 115s
	Middling to fine mid ...	85s a 95s
	Low mid. and low grown	75s a 82s 6d
	Smalls	55s a 75s
Native	Good ordinary	30s a 70s
Liberian ,,	Small to bold	33s a 40s
COCOA, Ceylon ,,	Bold to fine bold	84s 6d a 95s
	Medium and fair	73s a 82s 6d
	Triage to ordinary	60s a 70s
COLOMBO ROOT ,,	Fair to good	22s 6d a 30s
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair ..	£17 a £20 10s
FIBRE, Brush ,,	Ord. to fine long straight	£16 a £19
Cochin ,,	Ordinary to good clean	£18 a £24
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £33
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	38s a 45s
CUTCH ,, ,,	Fair to fine dry	23s a 35s
GINGER, Bengal, rough ,,	Fair	27s
Calicut, Cut A ,,	Good to fine bold	87s 6d a 92s 6d
B & C ,,	Small and medium	35s a 72s 6d
Cochin Rough ,,	Common to fine bold	25s a 34s
	Small and D's	25s a 28s
Japan ,,	Unsplit	26s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	20s a 45s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £20
	Part yellow and mixed	£8 2/6 a £10 10s
	Bean and Pea size ditto	70s a £9 2/6
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	80s a 100s
Madagascar ,,	Fair to good palish ...	£4 8s a £8
	,, ,, red ...	£4 5s a £9
ARABIC E. I. & Aden ,,	Ordinary to good pale	35s a 60s
Turkey sorts ,,		67s 6d a 85s
Ghatti ,,	Pickings to fine pale ...	12s 6d a 35s
Kurrachee ,,	Good and fine pale ...	52s 6d a 55s
	Reddish to pale selected	30s a 40s
Madras ,,	Dark to fine pale ...	23s a 35s
ASSAFŒTIDA ,,	Clean fr. to gd. almonds	40s a 80s
	Ord. stony and blocky	8s a 25s
KINO ,,	Fine bright	1s 6d
MYRRH, picked ,,	Fair to fine pale	65s a 75s
Aden sorts ,,	Middling to good	33s a 55s
OLIBANUM, drop ,,	Good to fine white	35s 6d a 50s
	Middling to fair	25s a 35s
pickings ,,	Low to good pale	17s a 20s
siftings ,,	Slightly foul to fine	16s 6d a 18s
INDIARUBBER, Assam lb	Good to fine	2s 10½d a 3s 4d
	Common to foul & mxd.	1s 4d a 2s 6d
Rangoon	Fair to good clean ...	2s 9d a 3s 3½d
Borneo	Common to fine	1s a 2s 4d

	QUALITY.	QUOTATIONS.
INDIARUBBER, (Contd).		
Java, Sing. & Penang lb.	Foul to good clean ..	8d a 3s 3½d
Mozambique ,,	Good to fine Ball ..	2s 8d a 3s 7d
	Ordinary to fair Ball..	2s a 2s 10¾d
	Low sandy Ball ..	1s 3d a 1s 7d
	Sausage, fair to good..	3s 2d a 3s 6d
	Liver and livery Ball	2s 4d a 3s 2½d
Madagascar ,,	Fr. to fine pinky & white	3s a 3s 6½d
	Fair to good black ..	2s a 2s 10¾d
	Niggers, low to fine ..	1s 4d a 2s 10d
INDIGO, E.I. ,,	Bengal—	
	Shipping mid to gd violet	3s 9d a 4s 6d
	Consuming mid. to gd.	3s 6d a 3s 8d
	Ordinary to mid.	3s 2d a 3s 5d
	Mid. to good Kurpah	2s 2d a 2s 8d
	Low to ordinary	1s 11d a 2s 1d
	Mid. to good Madras	1s 5d a 2s 6d
MACE, Bombay & Penang	Pale reddish to fine	2s a 3s
per lb.	Ordinary to fair	1s 4d a 1s 11d
	Pickings	1s 4d a 1s 4½d
MYRABOLANES, } cwt	Dark to fine pale UG	6s a 7s
Madras }	Fair Coast	5s 6d a 6s
Bombay ,,	Jubblepore	4s 3d a 7s
	Bhimlies	4s 9d a 9s 6d
	Rhajpore, &c.	4s 3d a 8s
Bengal ,,	Calcutta	4s 6d a 6s
NUTMEGS— lb.	64's to 57's	2s 4d a 2s 6d
Bombay & Penang ,,	110's to 65's	11½d a 2s 3d
	160's to 130's	6d a 11d
NUTS, ARECA cwt.	Ordinary to fair fresh	12s a 21s
NUX VOMICA, Bombay	Ordinary to middling	4s a 5s 6d
per cwt. Madras	Fair to good bold fresh	7s a 10s
	Small ordinary and fair	5s 6d
OIL OF ANISEED lb	Fair merchantable	5s 9d
CASSIA ,,	According to analysis	3s 6d a 4s
LEMONGRASS ,,	Good flavour & colour	2⅞d
NUTMEG ,,	Dingy to white	3d a 3½d
CINNAMON ,,	Ordinary to fair sweet	3½d a 1s 6d
CITRONELLE ,,	Bright & good flavour	11d a 1/0½d
ORCHELLA WEED—cwt		
Ceylon ,,	Mid. to fine not woody..	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ..	10s a 16s
	,, wiry Mozambique	10s a 11s
PEPPER—(Black) lb.		
Alleppee & Tellicherry	Fair to bold heavy ..	6⅛d a 6 3-16d
Singapore ..	Fair	6⅛d a 6 3-16d
Acheen & W. C. Penang	Dull to fine	5¼d a 5¾d
PLUMBAGO, lump cwt.	Fair to fine bright bold	55s a 60s
	Middling to good small	41s a 53s
chips ,,	Dull to fine bright ..	21s a 45s
dust ,,	Ordinary to fine bright	7s a 20s
SAFFLOWER ,,	Good to fine pinky .	65s a 75s
	Inferior and pickings .	40s a 60s
SANDAL WOOD—		
Bombay, Logs ton.	Fair to fine flavour ..	£20 a £50
Chips ,,	... ...	5s a £8
Madras, Logs ,,	Fair to good flavour ..	£20 a £50
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Bombay ,,	Lean to good ..	£4 a £5
Madras ,,	Good average ..	£4 a £5 nom.
Manila ,,	{ Rough & rooty to good	£4 10s a £5 15s
Siam ,,	bold smooth...	£6 a £7
SEEDLAC cwt.	Ord. dusty to gd. soluble	53s a 59s
SENNA, Tinnevelly lb	Good to fine bold green	5d a 8d
	Fair middling medium	4d a 5¼d
	Common dark and small	1¼d a 3½d
SHELLS, M. o'PEARL—		
Bombay cwt.	Bold and A's D's and B's Small ...	£4 a £5 12s 6d
Mergui ,,	Small to bold ..	£6 a £9 2s 6d
Mussel ,,	Small to bold ...	18s a £3
TAMARINDS, Calcutta...	Mid. to fine bl'k not stony	15s a 16s
per cwt. Madras	Stony and inferior ..	7s 6d a 11s
TORTOISESHELL—		
Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	19s a 22s 6d
TURMERIC, Bengal cwt.	Fair ...	30s
Madras ,,	Finger fair to fine bold bright	30s a 32s 6d
Do. ,,	Bulbs ..	17s
Cochin ,,	Finger ..	21s
	Bulbs ...	9s a 10s 6d
VANILLOES— lb.		
Mauritius and } 1sts	Gd. crysallized 3½ a 9 in	17s 6d a 27s
Bourbon ... } 2nds	Foxy & reddish 4½ a 8 ,,	17s a 24s
Seychelles 3rds	Lean and inferior ...	10s a 15s
VERMILION lb.	Fine, pure, bright ...	3s 3d
WAX, Japan, squares cwt	Good white hard ...	33s a 34s

THE

AGRICULTURAL MAGAZINE,

COLOMBO

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST,"

The following pages include the Contents of the *Agricultural Magazine* for May :—

Vol. XI.] MAY, 1900. [No. 11.

A LOCAL WORK ON CATTLE.

"CATTLE Notes" is the title of a booklet by W. A. De Silva, V.S. This is not the first little work published by the author who has already written more than one useful pamphlet on Agricultural subjects.

The contents are tabulated under the following heads: 1, Cattle and Buffaloes; 2, Description and Aging; 3, Cattle Food; 4, Cattle Sheds; 5, Handling of Cattle; 6, Signs of Ill-health; 7, Nursing and Attendence; 8, Medicinal Materials; 9, Prevention of Disease; 10, Disease and Treatment; 11, Milk Cows.

Chapter 10, dealing with diseases and their treatment, will, perhaps, be considered of most value by cattle owners, who should be glad to be furnished with directions and prescriptions in which common and easily-obtained drugs are recommended. A convenient list of these medicinal agents, together with their Sinhalese and Tamil names, is supplied on pages 39-42. We regret, however, to find that the author writes disparagingly of the value of protective inoculation against rinderpest, a means which we are confident is bound to play an important part in the stamping out of this scourge. We are quite at one with the writer when he says that "it is a great mistake to repose complete reliance in any one measure or remedy," and as a result neglect all ordinary recognised methods of prevention, but when modern science offers us an admittedly valuable means of controlling the spread of epizootic diseases, it would be hardly wise on our part not to take advantage of the offer and so make the most of every means at our disposal. However, that doctors disagree is proverbial, and considering the class for whom "cattle notes" is intended, we think that the author has succeeded admirably in explaining himself in simple and popular language so as to be easily understood by all classes of stock-owners.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF APRIL, 1900.

1	Sunday ..	Nil	17	Tuesday ..	·98
2	Monday ..	·13	18	Wednesday	·21
3	Tuesday ..	Nil	19	Thursday ..	·92
4	Wednesday	Nil	20	Friday ..	·4
5	Thursday ..	Nil	21	Saturday ..	1·02
6	Friday ..	Nil	22	Sunday ..	·14
7	Saturday ..	Nil	23	Monday ..	·28
8	Sunday ..	Nil	24	Tuesday ..	1·8
9	Monday ..	Nil	25	Wednesday	·88
10	Tuesday ..	Nil	26	Thursday ..	1·87
11	Wednesday	Nil	27	Friday ..	1·95
12	Thursday ..	Nil	28	Saturday ..	Nil
13	Friday ..	Nil	29	Sunday ..	·45
14	Saturday ..	Nil	30	Monday ..	·2
15	Sunday ..	Nil	1	Tuesday ..	5·28
16	Monday ..	Nil			
				Total..	16·01
				Mean..	·53

Greatest amount of rainfall in any 24 hours on the 1st May, 1900, inches 5·28.

Recorded by Mr. J. A. G. RODRIGO.

THE CULTIVATION OF YAMS.

It cannot be denied that the cultivation of yams is not sufficiently carried on in Ceylon, and that the product is not sufficiently made use of for food purposes. Indeed, such cultivation as we have is on the most limited scale, and only unsystematically carried on. In the West Indies on the other hand the yam is a regularly grown crop and duly appreciated as a food product.

In Ceylon we are accustomed to hear the word "yam" applied indiscriminately to the produce both of true yam plants, members of the natural order Dioscoraceæ and that of the Colocasias which belong the order Araceæ. But in the West Indies the name is confined to the former only, while the word "tania" is used to distinguish the produce of the Colocasias.

The following account of yam cultivation in the West Indies by Dr. Alford Nicholls is worthy of reproduction, as containing many valuable hints which should prove useful to local cultivators.

Yams are the esculent tubers of several species of Dioscorea that have been cultivated in warm countries for ages. More nutritious than the common potato, they supply an abundance of wholesome food to the inhabitants of tropical and sub-tropical regions: and, in the West Indies they enter very largely into the diet of all classes of the population.

Most of the cultivated varieties of yams are probably natives of tropical Asia, that have been introduced into the West Indies at an early period of their colonisation by Europeans, and now become almost wild. The only yam of good flavour and food value, that naturally belongs to the flora of the West Indies, is the "Wawwaw" of Dominica, *Rajania pleioneura*, which grows abundantly in the forests of that Island. It is dug up by the woodmen and sold in the markets of the chief town, for it is deservedly held in much estimation. After the hurricane of 1883, when most of the provision grounds in Dominica were laid waste, many of the country people subsisted for weeks almost entirely on wawwaws, dug up in the forests. All the yams are the produce of plants with slender twining stems measuring often as much as twenty feet in height, and bearing underground tubers which spring from the principal roots. The tubers vary in size and weight from the small cush-cush no larger than ordinary potato to the enormons yam weighing thirty or forty pounds, and measuring three feet in length. There is confusion in regard to the names and characters of the different yams, each country appearing to have its own nomenclature. There are four kinds of yams, however, commonly cultivated in the West Indies, and the most noticeable particulars concerning them are as follows:—

White Yam (*Dioscorea Alata*).—This is sometimes called the Barbados yam, is a native of the Moluccas and Java. The stem is square and winged at each angle. The leaves are large, heart-shaped and opposite on the stem. A peculiarity of this plant is that bulbils or small yams are borne on the stem, and when they are ripe they fall to the ground and reproduce the species. The tubers are large weighing from eight to ten pounds when grown in good soil. There are two principal kinds, the white and the red, the surface of the latter is of a deep purplish, and the interior of the tuber of a light purplish colour. A third kind called the water yam is characterised by the interior of the tuber being of a moist and clammy nature. These yams will keep well out of the ground, and they are much liked on account of their digestibility and their superior flavour.

Negro Yam (*Dioscorea Sativa*).—This is sometimes called the yellow, creole, or common yam, and it is a native of Java and the Philippine Islands. The stem, which grows to a length of fifteen or twenty feet, is round, prickly below and smooth above. The leaves are heart-shaped and alternate on the stem. The tubers grow to a large size weighing usually about ten pounds; they are palmated in shape and they are so brittle as to be easily broken. They are of a white or yellowish colour within, but the white kind is liked best. These yams do not keep in good condition for any length of time after their removal from the ground.

Guinea Yam (*Dioscorea Aculeata*).—In Jamaica this is sometimes called the Afou yam. It is largely cultivated throughout the West Indies, but its native country is Cochin China, and it comes also from Malabar. The stem is round, prickly and much branched. The leaves are broadly heartshaped, and either alternate or opposite on the stem. The tubers are very large, reaching a length of two or three feet, a diameter of six or eight inches, and a weight of from fifteen to twenty pounds. The interior is of a white or yellow colour, and when cooked the flavour is somewhat bitter.

Cush-cush Yam (*Dioscorea Triphylla*).—In Jamaica this is sometimes called the Indian yam; and in Guiana it is known as the Buck yam. The stem is roundish, the leaves are opposite on the stem and divided into three leaflets. The tubers are roundish—indeed, something like a potato in shape. They rarely exceed nine inches in length and three inches in diameter, but they are usually much smaller. It is said to be the smallest and most delicate of all the yams. The plant is prolific, sometimes bearing a dozen tubers on the roots. There are two principal kinds, the white and red, the latter bearing tubers that are purplish within.

Soil and climate.—All the yams require a rich sandy loam, deep and friable, for the rich tubers will not be able to develop properly in stiff heavy soils. The white yam, however, will grow well on calcarious soils of moderate depth. Good drainage is necessary, and this applies to most plants bearing underground tubers. The climate must be warm but not necessarily hot, as the plant thrives in the mountains and in extra-tropical regions. One authority states that yams will grow within a wide zone extending thirty degrees north and south of the equator.

Cultivation.—Most of the yams are propagated in the following way:—When the tubers are ready to be dug up, the tops are cut off with the vines attached, and care is taken not to disturb the plant more than is really necessary. The top is then buried again in the ground, and it and the base of the vine is moulded up with good soil and left undisturbed for about three months, when another

yam called the *head* is produced. Plants are then made by cutting the head into pieces, care being taken that each cutting possesses an eye, or bud, from which the new plant develops.

The land is usually lined out at distances of two feet each way or in rows three feet apart, the plants being set at distances of eighteen feet in the rows. At the site of the pickets the land is dug up, all stones and roots being removed, and the surrounding soil is then raked up so as to form a support for the vine to climb on. Sometimes two plants are set in each hill. The land must be kept weeded and an occasional moulding up may be necessary, as the heavy rains tend to wash down the hills. Catch crops of maize and sweet potatoes are sometimes taken off the land between the rows, but this system is a bad one except in very rich soil. From January till April is the best planting season, and the yams require from nine to eleven months to mature. Planting may, however, be undertaken in every month of the year so as to ensure a constant supply of esculent tubers. It has been calculated that an acre of land will yield four or five tons of yams in the year, and it is said that the same quantity of sweet potatoes may be taken as a catch crop of the ground; this brings the return up to nine tons, that is, the yield of ordinary potatoes from an acre of good land in England. But as yams and sweet potatoes contain more nutrient matter than the common potato, the actual yield of food is greater in the case of the tropical vegetables.

THE VALUE OF SEA-WEED AS MANURE.

Chemists tell us that the composition of sea-weed is very similar to that of farm-yard manure; if so, it is a matter for regret that so little use is made of it for manuring cultivated lands near the sea-borde. As is to be expected sea-weed contains a large percentage of moisture, and for that reason its carriage for long distances inland would not pay, but those whose lands lie near the sea should not neglect the opportunity thereby offered of a plentiful and cheap supply of manure, at certain seasons, that contains all the necessary elements of food for cultivated plants.

We are induced to take over from the *Australasian* the following account of the successful use of sea-weed in fruit culture in England, in the hope that it will encourage those who have an opportunity of using this waste material as a fertilizer, of doing so:—

A writer in *The Garden* says that those who have not tried seaweed in their orchards and fruit-gardens would be surprised at the beneficial effect it has on the trees, especially apples and pears, when, of course, it is used with care and moderation. This is particularly the case during dry seasons. An illustration of the value of seawood is given. At Bembridge, Isle of Wight, some land was recently reclaimed from the sea, and it was converted into a fruit, flower and vegetable garden. There is a great depth of sandy soil, composed to a great extent of thoroughly decayed seaweed and sand, and the way all vegetation thrives in it is marvellous. In other places during the last two summers crops were collapsing from the want of moisture, in spite of the mulching of stable litter freely applied. For light soils and for use during a very dry season seaweed will undoubtedly prove more valuable as a mulch than any other material generally used for this purpose.

Apart from any manurial properties it contains, it is, like salt, moisture-holding as well as feeding, the value and importance of which should not be ignored by those whose fruit trees are growing in too porous soils and where the rainfall is light. No healthier trees or better samples of apples could be seen than those growing in the garden referred to. It is not recommended that fresh seaweed be buried near to the roots of established trees, or that it be incorporated with the soil in forming a new orchard or fruit-garden, but frequent mulchings of the surface ground, piecemeal, are a safe means of stimulating growth and sustaining the trees under the trying influence of a long drought. By this means it would gradually find its way into the lower ground and undoubtedly improve its staple.

Another instance of the value of seaweed is given. The gardens at Arundel Castle are justly celebrated for their extent and the fine order in which they are kept. For many years past heavy mulchings of stable litter were annually applied to the fruit-trees, but it was found that the manure formed fine harbours for woodlice, beetles, earwigs, and weevils, as well as for sparrows and other birds; the fruits suffered in consequence, and the finest specimens formed the feeding ground at night of the numerous insect depredators. It occurred to the head gardener to use for a mulch seaweed, this was done, and now the fruit is large, bright, without a speck, and uninjured by any of the above-named pests.

Occasional dressings of seaweed to vines are also recommended. Too frequent applications of stable manure cause the soil to become sour or uncongenial to proper root-action. Seaweed varies considerably, some being far too coarse and heavy for the purposes mentioned, unless it has first had sufficient time for partial decomposition. Preference is given to that of a finer and lighter character, which, when collected, generally contains a fair amount of sand, making it more suitable in every way for use in the garden, whether it be for asparagus, fruit-trees, or even as a plunging material for pot plants during the summer months.

AN ACCOUNT OF THE COCONUT PALM.

There is hardly a tropical country on the face of the globe where the cocoa palm does not flourish, and it is impossible to ascertain its native country, though it is thought to be indigenous to some parts of Asia, perhaps Southern India. In the Coromandel and Malabar districts, and in the adjacent islands, it grows in the greatest luxuriance, preferring the sandy and rocky sea shores to the higher country, though it is often found some distance inland. It is common in Africa, and abounds in America and the West Indian Islands. Dr. Parry found it plentiful on the Islands of Santo Domingo, where it forms groves

on the sandy beaches at the outlet of mountain streams and bears fruit abundantly. It is found in Southern Florida, 20,000 trees having been planted on Long, Lignum-vitae and Sands keys alone, while examples 80 feet high and 50 years old are found at the mouth of the Miami River. Grows to 100 feet.

Its extensive geographical distribution is accounted for by the fact that the tree growing in such close proximity to the sea, the fruits falling on the beach are washed away by the waves and afterwards cast upon some far distant shore, where they rapidly vegetate. It is in this way that the Coral Islands in the Indian Ocean have been covered with these palms.

Coir fibre appears in the form of large, stiff, and very elastic filaments, each individual of which is round, smooth, very clean, resembling horse-hair. It possesses a remarkable tenacity and curls easily. Its colour is a cinnamon brown. These filaments are bundles of fibres, which, when treated with the alkaline bath and ground in a mortar, are with difficulty separated by the needles for microscopic examination.

The individual fibres are short and stiff, their walls very thick, notwithstanding which this thickness does not equal the size of the interior canal. The surface does not appear smooth; it is often sinuous and the profile appears dentated. The diameter is not very regular. The points terminate suddenly and are not very sharp. The walls appear broken in places as if they were pierced with fibres, corresponding with the tissues of the broken sections.

The fibre of the coconut palm is contained in the husk of the nut, which is composed of a mass of coir, as the separated fibre is called. The husks are removed by forcing the nuts into sharp iron or wooden spikes fixed in the ground, one man being able to remove the husks from 1000 nuts daily. The proper time for cutting the fruit is in the tenth month, as the fruit must not be allowed to get thoroughly ripe, for the fibre becomes coarser and more difficult to twist, and must remain longer in the soaking pits, which is a disadvantage, as the fibre is rendered darker. These pits in some of the islands are merely holes in the sand, and the nuts lie under the influence of the salt water a year, kept from floating away by large stones placed over them. Sometimes the nuts are soaked in freshwater tanks, and as the water is not changed, it becomes in time very foul and dark-coloured, which affects the colour of the coir. After soaking the fibre is readily extracted by beating. Fresh water is said to weaken the fibre, and, in fact, too long soaking will produce this result in any event. The coir from the islands of Kadamat, Kelton and Chetlat in the Laccadives is said to be of the best description, and the manufacture into cordage is done entirely by women. After it is taken from the pit and sufficiently beaten, the extraneous matter is separated from the fibrous portion by rubbing between the hands. After it is thoroughly cleaned it is arranged into a loose rowing preparatory to being twisted, which is done in a very ingenious manner between the palms of the hands, so that it produces a yarn of two strands at once. According to the old native system of treatment, the nuts sometimes remained in the pits eighteen months. The best commercial coir of today is obtained by better methods, and the soaking is accomplished in tanks of stone, brick, iron, or wood, the water being warmed by steam, which shortens the duration of the treatment very materially. Where machinery is used (in the after processes), the husks when sufficiently soaked are passed through a crushing mill, which flattens and crushes them ready for the extractor or breaking down machine.

In the latter the fibres are completely disintegrated, and are then passed through a "willowing" machine, to free them from dust and refuse. It is calculated that when treated in England 10,000 husks will produce 45 to 50 cwt. of spinning fibre and 9 to 18 cwt. of brush fibre. In the process of separating the fibre, the following commercial qualities are produced: The mat, or long fibres used for spinning purposes; the shorter, or more stubborn fibres (bristles) for brooms or brushes; the low or curled fibre for stuffing cushions, and the dust or refuse for gardening purposes. When dyed black, the tow has been used as a substitute for horse-hair. A singular use was proposed a short time ago for coconut dust or refuse. Taken before it is quite dry and subjected to great pressure, it is capable of forming plates of varying thickness, like mill board, only much more brittle. These boards, if used as backing for steel plates of ironclads, swell up on being punctured below the water line and soon close the orifice. If really effective, such plates could be produced at a trifling cost, for thousands of tons of coconut refuse float away annually down the rivers in India and elsewhere.

Three large coast coconuts will yield 1 lb. of coir, measuring about 130 feet, whereas ten small inland nuts are required for 1 lb., but it will give over 200 feet. Two lbs. of such yarn, averaging from 70 to 75 fathoms, are made up into sooties, of which there are fourteen in a bundle, averaging about a maund (28 lbs.). A Mangalore candy (560 lbs.) will thus be the produce of 5,600 nuts, and should contain 20,000 fathoms (20,000 feet) of yarn.

Coir fibre is used by the Spaniards of the South Seas instead of oakum for calking their vessels, and it claimed that it will never rot. Coarse cloth is sometimes made from the fibre which is used for sails. The principal use of coir, however, in the commercial world is for cordage and matting. "The character of coir has long been established in the East, and is now in Europe, as one of the best materials for cables, on account of its lightness as well as elasticity." Ships furnished with coir cables have been known to ride out a storm in security, while the stronger made but less elastic ropes of the other vessels snapped like pack thread. Coir cables were used extensively in the Indian Seas until chain cables were introduced. It is rougher to handle and not so neat looking as hemp rigging, but it is well suited to running rigging where lightness and elasticity are desired, as for the more lofty sheets; it, however, is too elastic for standing rigging. In vessels of 600 tons it is generally used for lower rigging. Tests of coir cordage by Dr. Wright gave the following results: *Hibiscus cannabinus* broke with 190 lbs. strain, coir broke with 224 lbs., but

bowstring hemp (*Sanseviera zeylanica*) required a strain of 316 lbs. to break it. In another series of experiments made at the office of the Marine Board of Calcutta, palm coir stood a strain of 823 lbs., when a remarkably fine specimen of European hemp stood 1,967 lbs. In this test the coir stood No. 12 in strength and No. 1 in elasticity, stretching 32 inches against 9½ inches of the hemp. Unfortunately, the length of rope was not given, though its size was 1½ in circumference.

The cocoa palm has other uses than for fibre which are of sufficient interest in connection with its textile uses, to briefly mention: The Cocoa-nuts are sometimes used for illuminating purposes, to light roads, and an excellent charcoal is yielded by the burnt shells. These in the entire state are manufactured into a great variety of vessels for household use. The tree itself is used in the manufacture of small boats, frames for houses, rafters, spear-handles, furniture, and fancy articles of different kinds. It is exported under the name of porcupine wood. "The Cingalese split the fronds in halves and plait the leaves so nicely as to make excellent baskets, and they form the usual covering of their huts, as well as the bungalows of the Europeans." These dried fronds also furnish fuel and are used for torches, or they are made into brooms by trying the midribs together. The leaves furnish mats, baskets and screens, and combs are made of the midribs of the leaflets in the Friendly Isles. Mats are also made of the coconut leaf cut out of the heart of the tree, which are described as of fine quality and used in the Laccadive Islands as sails for boats. A downy fibre is also taken from the plant which is used to stanch the blood in wounds after the manner of lint.

Coconut oil is one of the best-known products of the palm, especially as it is employed in the manufactue of stearine candles. In the East it is employed as lamp oil, and also for anointing the body. Fifteen coconuts produce about 2 quarts of oil. The drink known as toddy or palm wine is derived from the flower spathes before they have expanded. It is also distilled and produces an intoxicating liquor or arrack. It is also made into vinegar, or, if it is not allowed to ferment may be made to yield jaggery or sugar which is brown and coarse.

The palm grows well in Southern Florida, and while already producing nuts the coconut industry has assumed no importance, though a single company in Massachusetts extracts the fibre from imported nuts.—*Dr. Dodge, Washington.*

PRACTICAL HINTS TO HORSE OWNERS.

By A. CHINNIAH, G.B.V.C.

CHAPTER I.—(*Continued.*)

The eaves of the stable roof should be so constructed as to admit of the free passage of air.

Ridge or roof ventilation is an important condition in a stable. The absence of it induces the accumulation of impure air which would otherwise rise and pass out of the stable making way for a supply of pure air. Other systems of ventilation are adopted in continental cities, but it is unnecessary to describe these as they will be hardly of any practical use to my readers.

CHAPTER II.—FOOD AND FEEDING.

There is a great variety of horse foods, and a description of the chief foods, together will analyses, will be given later.

By nature the horse is intended to serve as an animal of activity and speed, but in a state of nature, where speed and activity are exercised either for pleasure or as a means of security against assailants, natural herbage suffices for the nutrition of the animal, which, to a great extent, expends its energy according to its strength. In a state of captivity, however, and as a slave to man, expending energy not according to its own instincts or inclinations, but according to the will and fancy of his master, the same food does not suffice to supply the wear and tear of the tissues induced by regular and hard work. While grass alone does not supply sufficient nurtriment to a hard-working animal, it is also to be objected to on the ground that if partaken of in large quantities, from its bulky nature it interferes with the free action of the lungs, and as a result incapacitates the animal from hard and fast work which it is expected to perform; while again energy is unnecessarily exhausted in the effort to digest and assimilate so bulky a food. It is for these reasons that working animals are fed on artificial concentrated foodstuffs. No single foodstufl, however, can be said to contain every element required for the proper nutrition of the animal economy, and it therefore becomes necessary to make up for the deficiency of certain elements of nutrition in one foodstuff by using with it another which supplies the want, and so two or more ingredients are mixed till the required standard of diet is attained. For instance, oleaginous seeds have to be mixed with cereals rich in starch and so on. For many reasons grains raised in the country are selected; they are of course to be preferred on the score of convenience and cheapness.

(*To be continued.*)

THE RATTAN INDUSTRY.

We are indebted to the *Kew Bulletin* of September-October, 1899, for the following account of the Rattan industry extracted from the Report of Henry P. du Bellet, United States Consul at Rheims for January, 1898:—

"Rattan is the name given to more than one hundred species of climbing palms of the genus *Calamus*, natives of inter-tropical Asia and Africa, most or all of which are perennial, simple or unbranched, cylindrical, jointed, very tough and strong, from the size of a goose quill to the size of the human wrist, and from 50 to 100 feet in length.

In the regions where it grows wild, rattan renders forests inaccessible by reason of its long, tough, and thorny stems, running from tree to tree and on the ground. These stems are used in the manufacture of numerous articles, the principal among which are walking sticks (very much in demand and often very high priced), riding sticks, cables, and very strong ropes, and when split into thin strips, are used for making seats of chairs,

baskets, withes and thongs, and all sorts of wicker ware.

One species of rattan—the *Calamus Draco*—from which is extracted a red, resinous substance, is employed for medicinal purposes.

From India is taken the rattan used in making walking sticks; its stem is very long, a little over 0·39 inch in thickness, with joints 19·63 to 39·37 inches apart.

From Cochin China and the Sunda Islands are annually exported large quantities of *Calamus rudentum*, one of the largest kinds of rattan used for cables and ropes. Its stem is very long and 0·78 inch thick near the middle, and from 1·37 to 1·96 inches in the lower part, its joints being often 78·74 inches distant from each other. These natural cables are so resistant and strong that, it is said, they are used for capturing wild elephants. Strong and handsome walking sticks are made from this species, and also from the *Calamus Draco*, the joints of the latter being from 59 to 62 inches apart.

From the Sunda and Philippine Islands are taken: (1) the *Calamus equestris*, used in the manufacture of riding sticks, a species from 196 to 221 feet in length and no more than 0·39 inch in thickness, with its joints 7·87 inches apart; (2) the *Calamus viminalis*, a species slimmer than the latter, which is used for wicker ware.

The manufacturers of rattan in the consular district of Rheims buy their raw material in Germany and Holland, whither it is shipped from Dutch India after a first preparation.

First of all, the bark is taken off and is used for making seats of chairs. The core of the stem is then split into several thin pieces and rounded off, when it is ready for making baskets.

To whatever use the rattan is put, it must be first decorticated and scraped. If it is desired to bend or plait it, it is softened in hot water, to which is added muriatic acid. Thick rattan is bent with light saw cuts, as is done with ordinary mouldings.

The output of the factories of this region is mostly consumed in the neighbouring territory and sold to wicker workers residing therein; the balance is purchased by Paris and a few London firms.

There are only two important and well-known rattan factories in this consular district which do a very good business.

Raw rattan, taken on board vessels in French ports, sells as follows: First quality $15·44, and second quality $13·51, per 100 kilograms (220,46 pounds.)

[The following are the species of Calamus (which belongs to the Palm family) found in Ceylon: 1, C. Thwaitsii; 2, C. Pseudo-tenuis; 3, C. Rotang; 4, C. Rivalis; 5, C. Delicatulus; 6, C. Radiatus; 7, C. Pachystemouus; 8, C. Digitatus; 9, C. Zeylanicus; 10, C. Ovoidens; all of which except the second (also found in India) are endemic.]

CLASSIFICATION OF USEFUL FIBRES.

(*Continued.*)

The surface fibres are still more varied in form. They may be the elongated hairs surrounding the individual pods which contain the single seeds of the thistle, familiarly known as thistledown, or they may be the hairy growths covering the clusters of seeds contained within large pods, as the cotton boll, the pod of the milk weed, or the seed envelope of species of Bombax found in tropical countries. In this group also is placed the leaf-scales or tomentum found on the under surface of leaves, &c., or on the leaf buds of both endogenous and exogenous plants, which can only be used for upholstery or as tinder. Epidermal strips of palm leaves, raffia being an example, are also included with the surface fibres.

The pseudo fibres are not fibres but substances used as their substitutes. However, they are so clearly defined in the scheme of classification, it will not be necessary to describe them further or to give examples.

The highest use for which a fibre may be employed is in the manufacture of cloth or woven fabric. As these fabrics vary greatly in texture from the fineness of the delicate linen cambric to the coarseness of jute bagging, it would seem that a large number of fibres might be considered spinnable forms and capable of manufacture. In point of fact, however, a comparatively small number are actually spun and woven as commercial articles, these having proved their superior adaptability for special purposes for which they are employed, and the form and appearance of the different manufuctures from them having become in a measure so fixed that change could not be made without serious result. And, besides, it should be recognised that such change might necessitate complete change in the entire system of textile machinery employed in a special industry. Examples of the fabric fibres of the first rank are China grass (bast fibre), pineapple (structural fibre), and cotton (surface fibre); of the second rank, jute (bast fibre) and coir or coconut (structural fibre). The fabric fibres are, therefore, easily disposed of, and we come to the next of the higher uses in which fibres are employed, the manufacture of threads, twines, cords, and ropes, or, reduced to a term, cordage. The fibres employed for this group of manufactures include all the spinning and weaving fibres, which for the most part are employed in the manufacture of thread and fine twines, and a large number of coarser fibres, which also have their substitutes, for the manufacture of which ordinary systems of cordage machinery are generally adapted. In this group must also be included a still larger number of "native" fibres, or those which are extracted, prepared, and rudely spun or wrought into ropes by hand by the natives of the countries where they are produced, the finer kinds being used for sewing thread, fish lines, nets, and hammocks. Even the group of native fibres used for cordage is capable of subdivision into *prepared* fibrous material for spinning and twisting, and *unprepared* bark, or the whole stems or leaves of plants or bundles of unprepared bast, simply twisted together to form a very rough rope or cable. Such cordage has been largely used in South America and in India in the construction of rope bridges. Examples of the cordage fibres are: Commercial—for threads, flax (bast fibre); for twines, common hemp (structural fibre); Native—for fine twines, fish lines, &c., Indian hemp (or *Apocynum*) (bast fibre); for ropes, the Yuccas

(structural fibre); for binding and rough sewing material, spruce roots (woody fibre); and for fish lines, kelp or sea-weed, used in Alaska and other high norther latitudes (pseudo fibre).

The third use is the preparation of certain tree basts that are extracted from the bark in layers or sheets, and which, by pounding, are made into rough substitutes for cloth. Such cloth has long been used by the natives of the Pacific Islands, and is known as *Tappa* or *Kapa*. Other forms, such as the *Damajagua* of Ecuador, are used in South America as cloth, while similar fibrous bast is employed in India in its primary form for sacks, &c. In this group are also included the more delicate tree basts that are extracted in thin lace-like layers and known as lace-barks, as well as other forms of which the cigarette bast or Cuban bast is an example. Certain close-textured fibrous growths from palm trees, when they may be secured in thin sheets, likewise come into this category.

A fourth use is in the manufacture of brushes and brooms for which a different class of fibres are employed than either the fabric or cordage fibres. The first essentials of a brush fibre are toughness and stiffness, qualities found in many of the fibres from Endogens, and the brush fibres, therefore, especially the commercial species, are largely derived from palms. Grasses and grass roots are also used, while the best substitute for animal bristles is a species of Agave, the fibre-vascular bundles of which are large, smooth, rigid, and cylindrical. The most important commercial brush fibres derived from palms are noted as Piassaba or Bass, of which there are several forms from as many different species. An American example of palm brush fibre is found in the finished product from crushed and softened palmetto leaf stems. Coarser brush material consists of twigs or small stems of woody plants, or even of splints of wood, while the aborigines and "natives" use anything that has the requisite stiffness, from a bunch of grass to the small branches of bushes tied together. Examples of commercial brush fibres are Tampico from *Agave heteracantha*; Piassaba or Bass, from *Attalea funifera*, a palm; and broom root, from the roots of *Epicampes Macroura*, a Mexican grass.

The fifth group of uses comprises plaited or coarsely-wowen manufactures of articles employed in the domestic economy, some of which are of commercial importance, while the greater number are "native" productions. The materials used are the whole stems of weeds, rushes, or grasses, palm leaves, coarse tree basts, &c., wrought or plaited together in the simplest manner possible. Some of these articles may be enumerated as follows:—Mats and mattings, screens, wallets, bags, saddle cloths, sandles, hats, toys, chair seats, and basketry in endless form.

Examples of the commercial manufactures are the Japanese mattings from the mat rush (*Juncus effusus*), the Russian mattings from the bast of the linden tree, the finely-subdivided leaves of *Carludovica palmata* for panama hats, and the split stems or straw of wheat, rye, barley, and rice for braids or straw plait, all of which are structural fibres save the Russian bast. Examples of "native" or aboriginal manufacture are the sleeping mats from various sedges or grasses, the East Indian *tattees* and screens from the fragrant roots of the khus-khus; the split leaves of Yucca used for making sandals, and the raincoats of China and Japan.—*Useful Fibre Plants of the World*.

THE DIFFERENT FORMS IN WHICH NITROGEN IS UTILISED BY PLANTS.

If we follow the example of Boussingault and plant a sunflower seed in a sterile soil to which the necessary mineral matter and increasing amounts of nitrates are added, or if we repeat the experiment of Hellriegel and plant barley in well-washed sand to which sufficient mineral matter and increasing amounts of calcium nitrate are added, we shall find that the crop produced increases with the amount of nitrate added. In Hellriegel's experiments less than 1 gm. of dry matter was produced when nitrates were not added, the production of dry matter increasing to 25 gm. when sufficient nitrates were supplied.

These experiments, however, simply demonstrated in an exact manner facts which were already well known in practice. The consumption of nitrate of soda would never have reached its present enormous proportions if farmers had not learned to appreciate the efficacy of nitrates as a fertiliser. At the present time they enter into all fertiliser formulas. The application of this fertiliser is necessary, because we are not yet able to so control nitrification in the soil that it can be made to furnish sufficient nitrates for the demands of the crop at exactly the time in the spring when they are most needed. Nitrates are produced only in warm and moist soils, and they are found in the drainage water in larger proportion in autumn than in any other season. Fortunately the roots of living plants have great capacity for retaining the nitrates, and thus reduce the loss in drainage.

If wheat roots are drawn from the soil during the winter, dried and soaked in sulphate of diphenylamin, they will take on a deep blue colouration. The amount of nitrates contained in wheat roots is surprisingly large. The author has found as much as 1 per cent. in dried roots, but the proportion decreases as growth advances. They pass from the roots to the stems and then to the leaves, where they are used in the formation of albuminoid substances. It might be a matter of surprise that substances which are so easily soluble in water as the nitrates can nevertheless be taken up and retained by roots even when surrounded by moist soil. Demoussy has shown that nitrates can not be removed from the roots by washing in cold water, but are extracted when the roots are treated with warm water or when they are subjected for some time to an atmosphere of chloroform and then washed with cold water. It appears, therefore, that the nitrates penerate by osmosis into the interior of the cells and form unstable combinations with the protoplasm, resuming their normal state only when the protoplasm is modified by elevation of temperature or the action of chloroform.

Experience has shown that whether nitrates are formed in the soil by the action of micro-organism, or introduced in the form of fertilisers, they exert a decided influence upon the crop. Nitrates are not formed in soils like those of meadows or forests, which are highly charged with decaying organic matter, since these soils are acid and therefore do not furnish a suitable medium for the nitric ferment. Liming renders such soils more favourable to the activity of the nitric organisms.

In meadow and forest soils nitrogen appears to be taken up by plants in the form of ammonia. Bréal has shown that nitrogen is also taken up by plants in the form of humates of lime or potash.

Hellriegel has shown in experiments with barley fertilised with variable amounts of nitrates that the amount of water transpired by the plant per gram of dry matter increases as the amount of nitrates applied decreases. Barley, which received the most favourable amount of nitrates, evaporated 260 gm. of water per gram of dry matter produced. The plants which received no nitrates and which made a sickly growth evaporated from 700 to 800 gm. of water per gram of dry matter. Normal, vigorous plants obviously evaporate more water than sickly ones, but if we calculate the ratio of the quantity of water transpired to the weight of dry matter produced we find that the proportion is greater in the sickly than in the vigorous plants. This fact may be useful in determining the efficacy of a fertiliser.

By pursuing this method of investigation the author found that the Gramineæ and Leguminosæ do not take up and utilise plant food in the same manner. The Gramineæ are especially benefited by chemical fertilisers, particularly nitrates, while they do not utilise humus substances to very great advantage. On the other hand, Leguminosæ are more benefited by the humates than by nitrates or ammonia salts.

Rye grass and clover were planted in large pots, each of which contained 50 kg. of soil exhausted by continuous cropping. Equal amounts of phosphoric acid, potash, and nitrogen were applied. In one case the nitrogen was applied in the form of nitrates, in the other in the form of humate. A black extract from manure which contained a mixture of humate of potash and humate of ammonia was also used. At the end of the experiment it was found that the rye grass which had received no manure had transpired 682 gm. of water per gram of dry matter, that which had received humates 435 and 469 gm., and that which had received only chemical fertiliser 233 gm. The results were quite different with clover. In this case the transpiration was: without manure 454 gm., with chemical fertilisers 398 gm., and with humates 272 and 265 gm. These results confirm the conclusions of Bréal, Snyder, and Lawes and Gilbert. The latter have shown at Rothamsted that it was impossible to grow clover continuously on the same land unless the soil was abundantly supplied with organic manures.

To summarise, then, nitrogen is taken up by plants in the form of nitrates, ammonium salts, and alkaline humates. The Leguminosæ can utilise free nitrogen only when it has been brought into combination by the action of the organisms of the root tubercles. It has frequently been claimed that other plants besides the Leguminosæ are capable of absorbing free nitrogen, but it has been shown that this absorption does not take place without the intervention of the organisms which fix nitrogen.

THE BANANA AS AN ARTICLE OF FOOD.

[SPECIALLY TRANSLATED FOR "INDIAN GARDENING" FROM THE *Belgique Coloniale.*]

In the Congo country, and in almost all tropical countries, the Banana constitutes an important resource of food for European and native alike. Hardly is a new station or village formed than a Banana plantation is started to ensure, after a brief period, food in abundance.

The Banana is very nutritious and forms almost a complete sustenance; it contains more than 25 per cent. of assimilable organic matters. According to Humboldt, it is 48 times more nuritious than potatoes; and according to Crighton Campbell, the apostle of the diffusion of the Banana in America, it is 28 times as nutritious as the best wheaten bread.

The negroes occasionally consume Banana meal, which they prepare in an altogether primitive manner. They dry the fruits and pound them in a mortar. Placed in jars or sacks, away from damp, this meal remains good for a long time. It is also very nourishing and used especially on journeys. A very healthy and refreshing drink is made from it. In Central America, Columbia and Venezuela, Banana meal is made on a great scale.

For the preparation of Banana meal the fruit is stripped of its skin and cut in rounds, which are placed in a drying apparatus. After it is completely dry, it is ground and passed through a sieve. The production of meal is from 20 to 25 per cent. An amount of raw material 15 lbs. in weight gives 3 lbs. of meal.

In order to obtain more exact ideas of the nutritive value of Banana meal, Dr. Thoms, Director of the Laboratory of Pharmaceutical Chemistry at the University of Berlin, has analysed it. It contains 1·455 per cent. of nitrogen, corresponding to 9·01 per cent. of nitrogenous matter. In consequence, the nutritive value of Banana meal is very great and sensibly approaches that of the best wheat flours, which do not contain more than 9 to 11 per cent. of nitrogenous matter. For the manufacture of meal, it is preferable to use fruit which is not altogether ripe, as the starch which is contained changes to sugar in a measure as it arrives at maturity. For the rest, the following results of analysis show its value abundantly :—

	Unripe Bananas.	Ripe Bananas.
Water	70·92	67·78
Starch	12·06	Traces
Grape Sugar	0·08	20·47
Cane Sugar	1·34	4·50
Fat	0·21	0·58
Nitrogenous matter	3·04	4·72
Crude fibre	0·36	0·17
Tannin	6·53	0·34
Ash	1·04	0·95
Other matters ...	4·62	0·79

In Venezuela Banana meal is specially given to children; it is recommended also to aged persons, convalescents, to wet nurses and to all who suffer from disorders of the stomach.

According to the *Tropenflanzer*, Banana meal is put to the following uses in Central America and Venezuela, where it is sometimes sold under the name of *Musarina*.

1. *Atol commun.*—A spoonful of *Musarina*, a small cup of milk, a little sugar and salt. After dissolving the meal and sugar separately in a little water, the ingredients are mixed together, and after baking (*cuisson*) for a few minutes, the salt is added.

2. *Atol tonico.*—The same preparation, water being substituted for milk; a little cloves, cinnamon, aniseed, fine herbs, or orange may be added.

3. *Chocolate or cocoa.*—A small spoonful of *Musarina* is mixed with a cup of chocolate or cocoa to facilitate digestion of these beverages, and to render them more nutritious; in this fashion also feeble stomachs may be habituated to cocoa.

4. *Sopa salada.*—A spoonful of *Musarina* dissolved in cold water is added to a cup of broth and left for some minutes; a few spices may be added.

5. *Cordial.*—The yolk of an egg is beaten up and mixed with 30 grammes (about 1 oz.) of sugar and one spoonful of *Musarina* dissolved in a cup of milk. A little powdered cinnamon may be added.

6. *Postre.*—Three well beaten eggs, 250 grammes ($\frac{1}{2}$ lb.) of sugar, the rind of a citron, 125 grammes ($\frac{1}{4}$ lb.) of *Musarina* dissolved in a cup of milk; mix, adding 30 grammes (1 oz.) of butter and place in an oven in a buttered shape.

Torta à la sarten—Sixty grammes (2 oz.) of *Musarina*, a well beaten egg, a cup of milk, a little salt, and a small spoonful of butter; mix and cook.

Banana meal may be utilised also in the same manner as the "superior" flours, except for the making of bread, the Banana containing no gluten.

Banana meal is delivered at the London market at 27 livres per ton (ex warehouse at the London docks); but the sale is insignificant owing to the high price and the ignorance concerning the employment of the product.

The day may perhaps come when Europe will have, like America, its Crighton Campbell to devote himself to the diffiusion of the Banana as an article of food.

GENERAL ITEMS.

Rinderpest has broken out in more than one part of the Island. In Colombo there have been but few cases so far, but the disease appears to have appeared with greater virulence upcountry, in the neighbourhood of Talawakele and Nanuoya, and both the Government Veterinary Officer (Mr. Hoole) and Veterinary Surgeon Chinniah have been in requisition in these districts, where the latter has been carrying on preventive inoculation. We trust that with the change in the weather the outbreak will soon disappear.

Professor Farmer, of the Royal College of Science, South Kensington, has been appointed assistant to Dr. Watt, Reporter on Economic Products to the Government of India, to which post it is expected he will succeed on the retirement of Dr. Watt.

It will astonish not a few to hear of buttons made of milk, but this is no hoax, as the following from the *Queensland Agricultural Journal* will prove:—Those creamy-looking white buttons which you see street hawkers in London offering you at twelve for a penny, one of which you may wear on your shirt collar, are made of milk. The milk is that which has become sour at the large dairies. It is sent to three large manufactories in the East End of London, and there churned very much after the manner of making cheese, into buttons. This cheese is then put under enormous pressure until every drop of moisture is wrung from it, when it is passed into a chemically heated room. It is then, while under great heat, bleached white and flattened out, ready to be punched into the required shapes. It is found that buttons can be made in this way at less than half the cost entailed in manufacturing bone ones, and, besides never rubbing away, do not turn their colour.

The watering of live stock is an important part of the farm work. But, while all animals on the farm require more or less attention in this particular, none need it more than the cow giving milk. Many farmers fail to realise the importance of giving their milch cows all the pure water they require both winter and summer. The amount of water a cow will drink depends upon the kind of feed she is getting. Where roots or ensilage is fed the amount of water is considerably lessened, because there is a considerable amount of water in these feeds. Cows, as a rnle, require more water during the winter than during the summer when on fresh pasture, and a cow in a full flow of milk requires a great deal more than one not in milk. In fact, a cow cannot give the very best returns in the milk pail unless she is liberally supplied with drinking water. Several experiment stations in the United States have tested this question with somewhat varying results. At the Copenhagen station it was found that seventy-six cows required an average of 97·9 lb. of water per day, or about 12 gallons each. At the Pennsylvania station it was found that cows averaging 733 lb. in weight confined in stalls in the summer and living on fresh grass drank 61 lb. each per day, while confined in stalls at a temperature of 73 degrees and fed on dry grass they drank 107 lb. According to Professor Henry, cows, generally speaking, require about 4 lb., or half-a-gallon of water to each pound of dry matter in their food. A New York authority says that provision should be made for eight gallons a day per cow in order to be sure of a full supply. At the Geneva station it was found that cows in full milk required $4\frac{3}{8}$ lb. of water for every pound of milk. It follows, therefore, that the heavier the milk the larger the amount of water is necessary.—*Scottish Farmer.*

The *Queensland Agricultural Journal*, quoting the following from the *Danish Milk Times*, says:—The question has been asked: Ought milking to be done in quick or slow tempo? To answer this a series of trials have taken place in Germany, one of which we herewith publish. On the farm where the trials took place were the same lot of cows—five in number—alternately milked by an elderly woman, who milked very slowly, and by a very able young milkmaid, who finished her work in a very much shorter length of time. The following figures gives the milk-yield from the same number of cows—milked at the same time of the day—in pounds:—

No.		Slow Milking.		Quick Milking.
1	...	32	...	38½
2	...	34½	...	51½
3	...	50	...	68½
4	...	40½	...	43
5	...	44½	...	50

As an explanation of this enormous difference it is said that, by the quick milking, the milk-glands were influenced so as to give a larger quantity of milk.